VOLUME XXIV NUMBER SEVEN

THE NATIONAL GEOGRAPHIC MAGAZINE

JULY, 1913

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Scenes in Out-of-the-Way Places

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and received the Gold Medal. It was again exhibited at the World's Fair in St. Louis, receiving the Grand Prize. This series of ghout the world to the possibility of animal photography at night.

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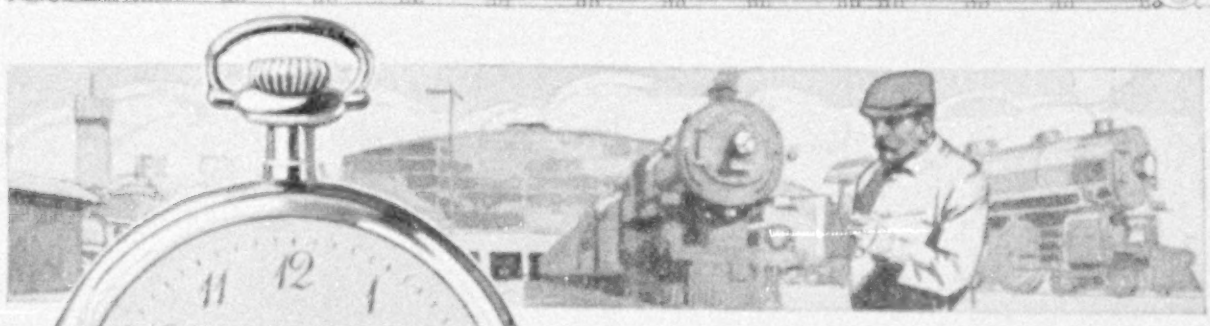

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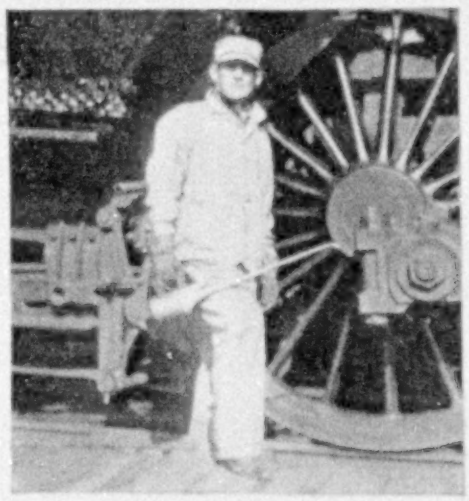

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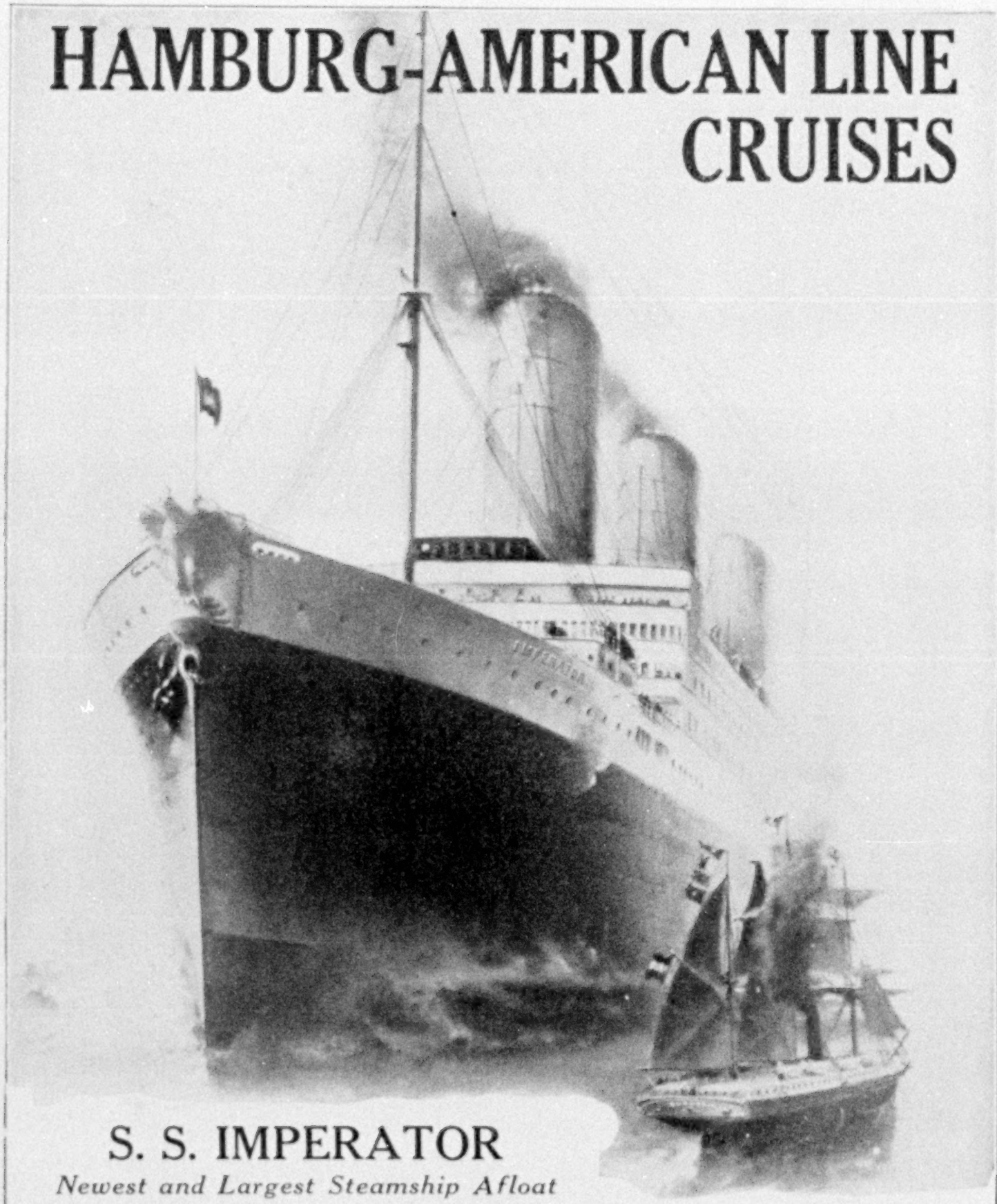

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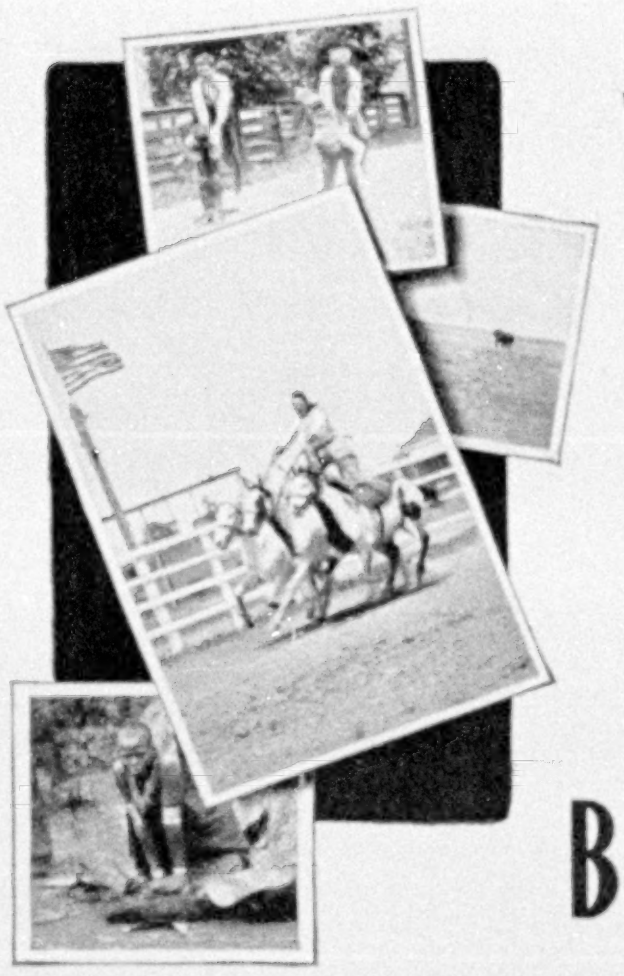

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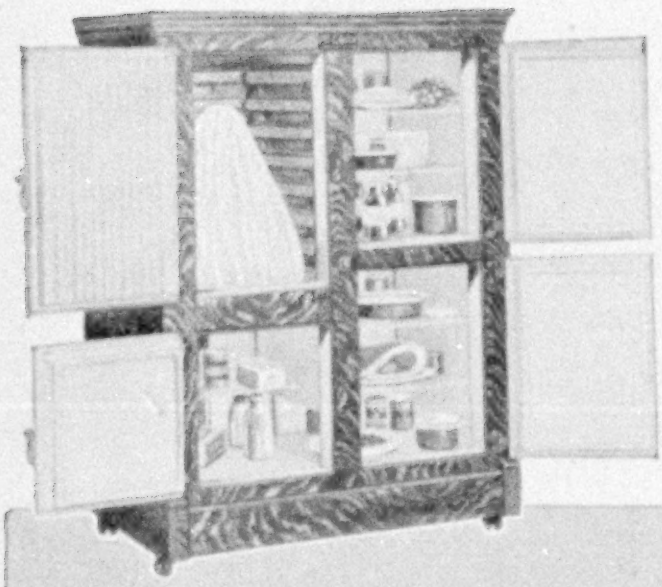

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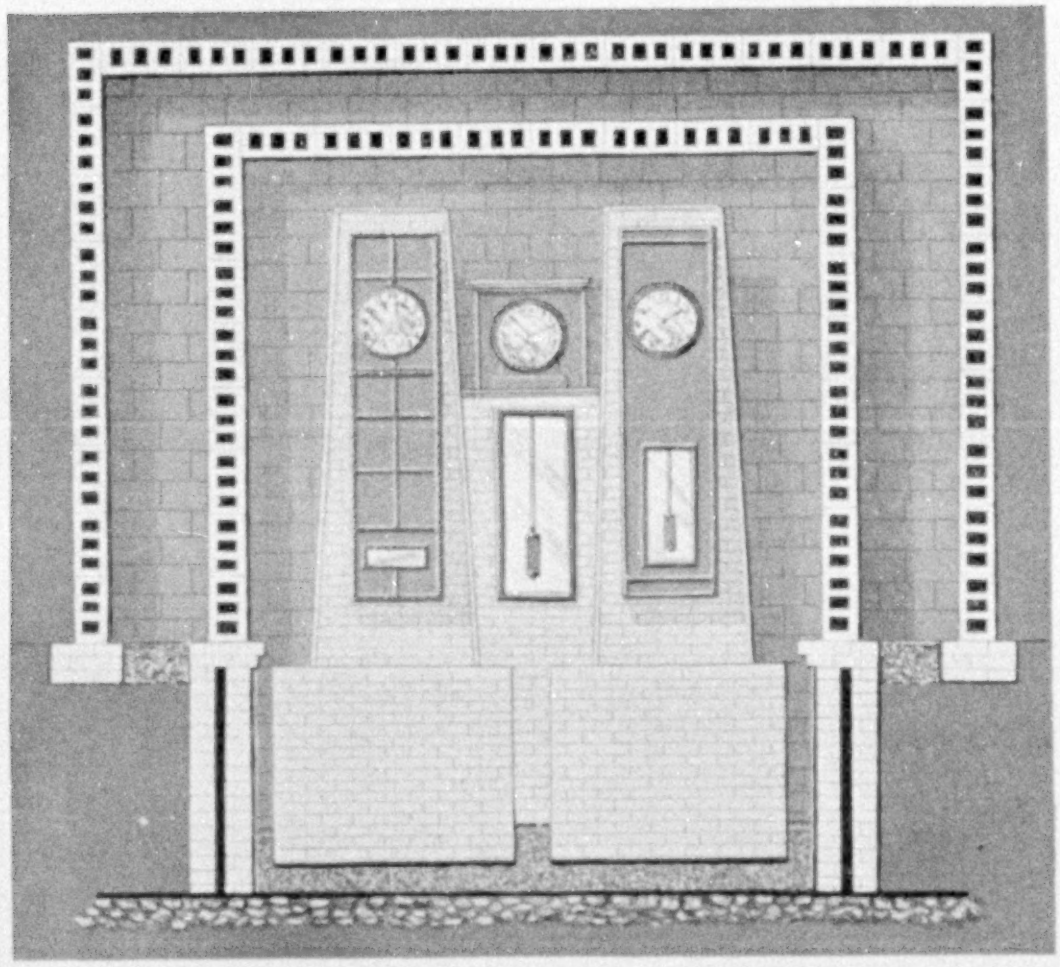

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VOL. XXIV, No. 7 WASHINGTON JULY, 1913

THE NATIONAL GEOGRAPHIC MAGAZINE

WILD ANIMALS THAT TOOK THEIR OWN PICTURES BY DAY AND BY NIGHT

BY GEORGE SHIRAS, 3RD

Mr. Shiras, as a pioneer in camera hunting and the originator of night photography of wild animals, has also assisted in the conservation of wild life by being the author, when in Congress, of the original bills putting under Federal control migratory fish and migratory birds, which latter measure, known subsequently as the Weeks-McLean Bill, became a law March 4, 1913. This act, covering migratory wild-fowl, and by later amendment insectivorous birds, is the most important bird legislation ever enacted for the benefit of sportsmen, nature lovers, and agriculturists. In a brief filed with the Senate in 1912, Mr. Shiras also suggested a series of international agreements to protect birds migrating between nations, and a resolution has been offered in the Senate calling upon the President to negotiate such treaties.

Readers of the National Geographic Magazine will recall with much pleasure the very original and instructive articles by Mr. Shiras, previously published in this magazine, as follows: "Photographing Wild Game with Flashlight and Camera," with 72 illustrations; "One Season's Game Bag with the Camera," with 70 illustrations; "A Flashlight Story of an Albino Porcupine and of a Cunning but Unfortunate Coon," with 26 illustrations, and "The White Sheep, Giant Moose, and Smaller Game of Kenai Peninsula, Alaska," with 62 illustrations.—EDITOR.

IN THE hopeful endeavor to contribute an individual share toward the knowledge of animal life and perhaps to stimulate that interest by pictorial representations more appealing than the writer's pen, there are hereafter presented the home life and forms of a number of wild animals, common and rare, some of which wander every night within a stone's throw of nearly every rural home, while others frequent a sanctuary offered in some distant wilderness.

THE AUTOMATIC CAMERA IN THE PICTURING AND STUDY OF ANIMAL LIFE

The purpose of this article is to show that a camera and accessories can be so arranged that any animal or bird and many a reptile, however large or small, agile or cunning, may have its picture faithfully recorded, during daylight or darkness, without the immediate presence of a human assistant.

While most birds and daylight-feeding animals, like the elk, caribou, mountain sheep and goat, and small animals, such as the squirrel and woodchuck, present no insurmountable difficulties in photography, getting a good picture of others is often uncertain or irksome when the game photographer must either await their coming or attempt a near approach.

In many instances, owing to the nocturnal character of the animal, the keen-

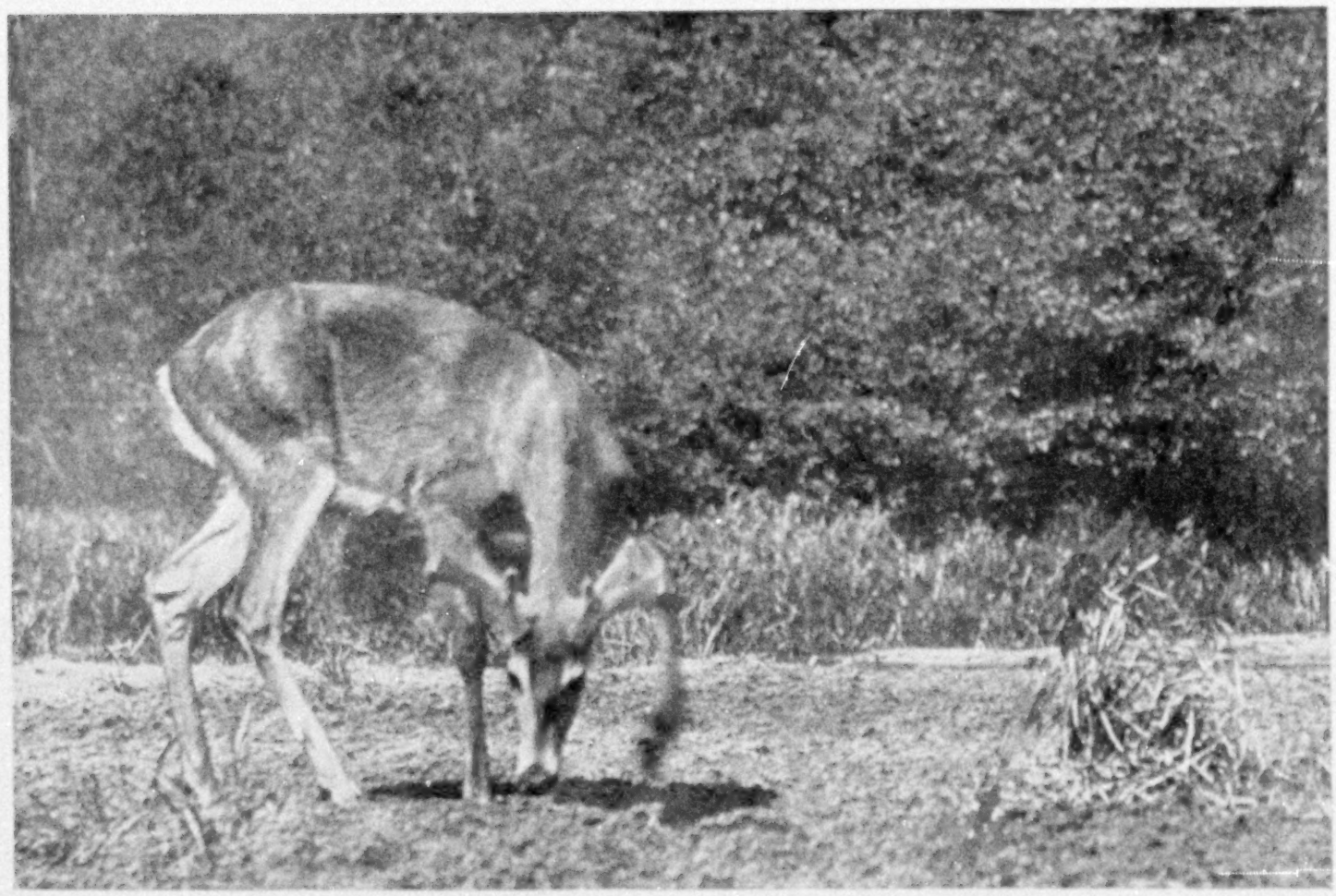

Photo by George Shiras, 3rd

A WHITE-TAIL BUCK TAKES ITS OWN PICTURE IN DAYTIME

While pawing in the sand for salt the animal struck the camera string with the left foot. The picture was taken in June, when the animal was in a gaunt condition and the horns partly grown (see page 772).

ness of scent and vision, with the habit of skulking in thick underbrush or occupying points of vantage where no approach can be made, I have usually found it a waste of effort to try to get pictures in the ordinary way; for, even if occasionally successful, the loss of time can be avoided by the use of the set camera.

As a rule, the fur-bearing animals and those of predaceous habits are the hardest to photograph with a hand-manipulated camera, for they seldom appear in daylight and fear an artificial light at night. To meet these difficulties, I have developed methods suitable to the habits of each animal. In the main, I have used many of the devices of the trapper rather than the hunter, substituting the automatic camera for the trap and using the same baits and scents in favorable localities and during the season of the year when success was likely.

The greatest immediate pleasure which comes to the camera hunter when, on foot, he can successfully stalk, or in a canoe quietly paddle up to, a big-game animal, and at other times get pictures from the recess of a well-concealed blind, can still be followed while, at the same time, there are secreted in the forest or along the waterways several cameras capable of picturing the living form of many an elusive animal, and that, too, without the loss of time or patience.

In this branch of photography one should have a fair knowledge of the habits and range of the animal sought; for while there are many—if they can be located—that will seize almost any kind of bait, regardless of human scent or the appearance of a poorly concealed camera, such as the raccoon, opossum, skunk, muskrat, woodchuck, rabbit, or squirrel; yet in the case of others, like the beaver, bear, fox, wolf, and deer, one should follow the cautious methods of the trapper when he erects a dead-fall, sets a steel trap, or puts out poisoned bait.

Then, toward the close of the day

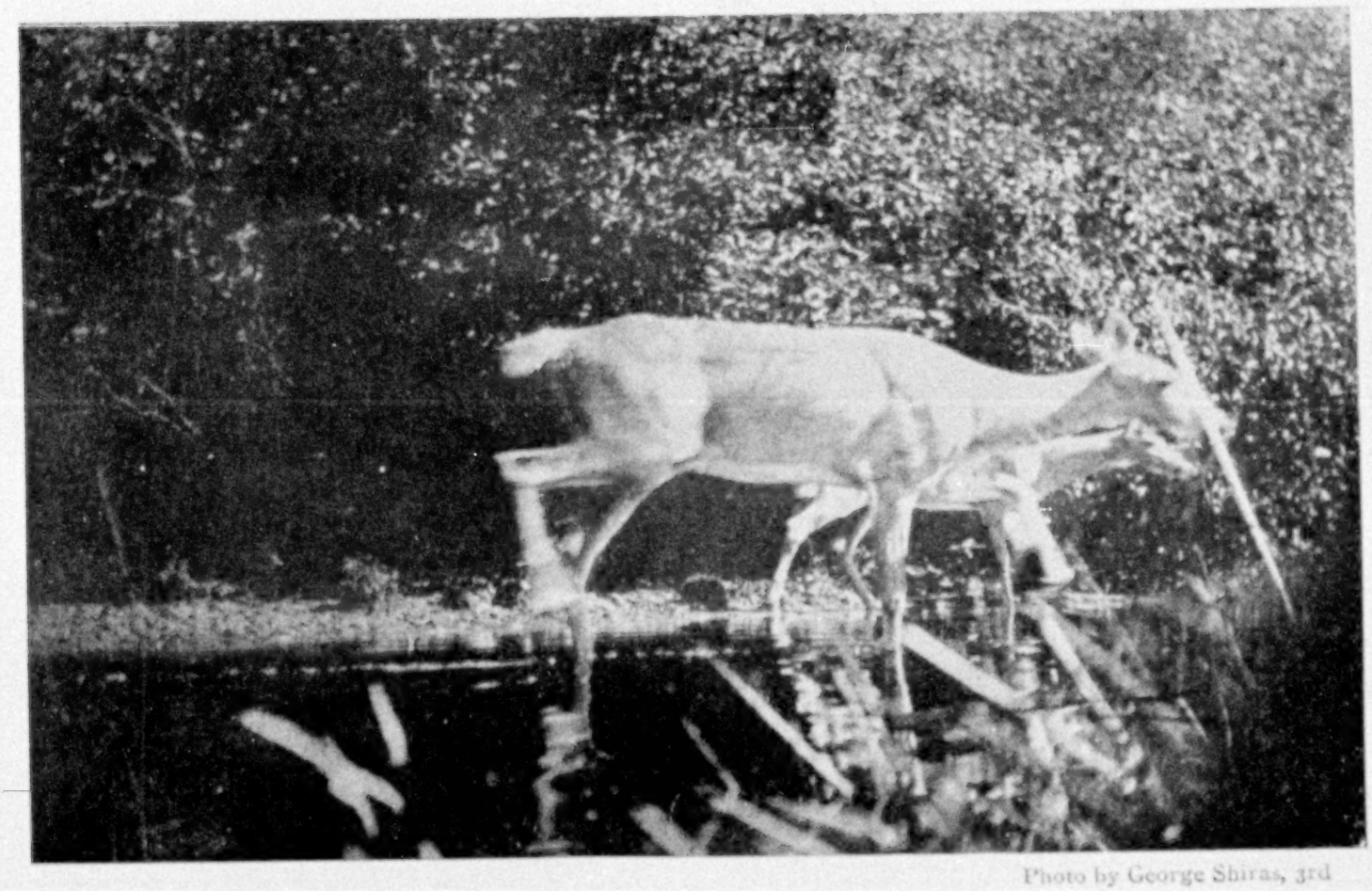

Photo by George Shiras, 3rd

A PAIR OF WHITE-TAIL DOES WHO TOOK THEIR OWN PICTURES

The camera was placed on an abandoned muskrat house, and as the deer ran splashing by to escape the flies, the string was broken. This photograph was made in 1889, before the focal-plane shutter was available.

when the fading light puts an end to the use of the hand camera, one may expectantly visit the camera traps, and if the string across the runway is broken or the bait disturbed, the surroundings should be carefully examined for the hoof-marks of a frightened deer or the scratches made by the claws of some carnivorous animal fleeing on the click of the revolving shutter. If, however, no visitor has come, the flashlight machine may be adjusted and the shutter of the camera reset at a much slower speed, so that when some night prowler presses against the string or eagerly pulls at the bait the flash will illuminate the surroundings while the sensitive plate records the scene.

Then, when the blazing camp-fire accentuates the darkness of the night, the sportsman, lying within the narrow circle of its warmth, may suddenly see a dazzling column of light ascend on a distant hillside, or illuminating with a momentary flutter the gloomy valley of some water-course; and in a few seconds the deep, dull boom of the exploding powder suggests an animal fleeing in needless terror from a spot where the weapon contained no bullet and where its recorded visit will prove a source of pleasure to one who meant it no bodily harm. As I usually explode a compound of magnesium powder in a hermetically sealed box—to insure higher speed and the exclusion of moisture—I have sometimes heard the report at a distance of three miles and noticed the flash at a much further distance.

Therefore one can imagine the surprise and terror of some timid animal when experiencing the first dazzling explosion. Yet, as will be shown later, the pangs of hunger or the cravings for some particularly choice food will lead many of these animals to return to the interrupted feast, and in the course of time the blinding light and roar seem to be regarded as a harmless manifestation of nature, like thunder or lightning. And then one may, if he desires, get a series of interesting night pictures, in every at-

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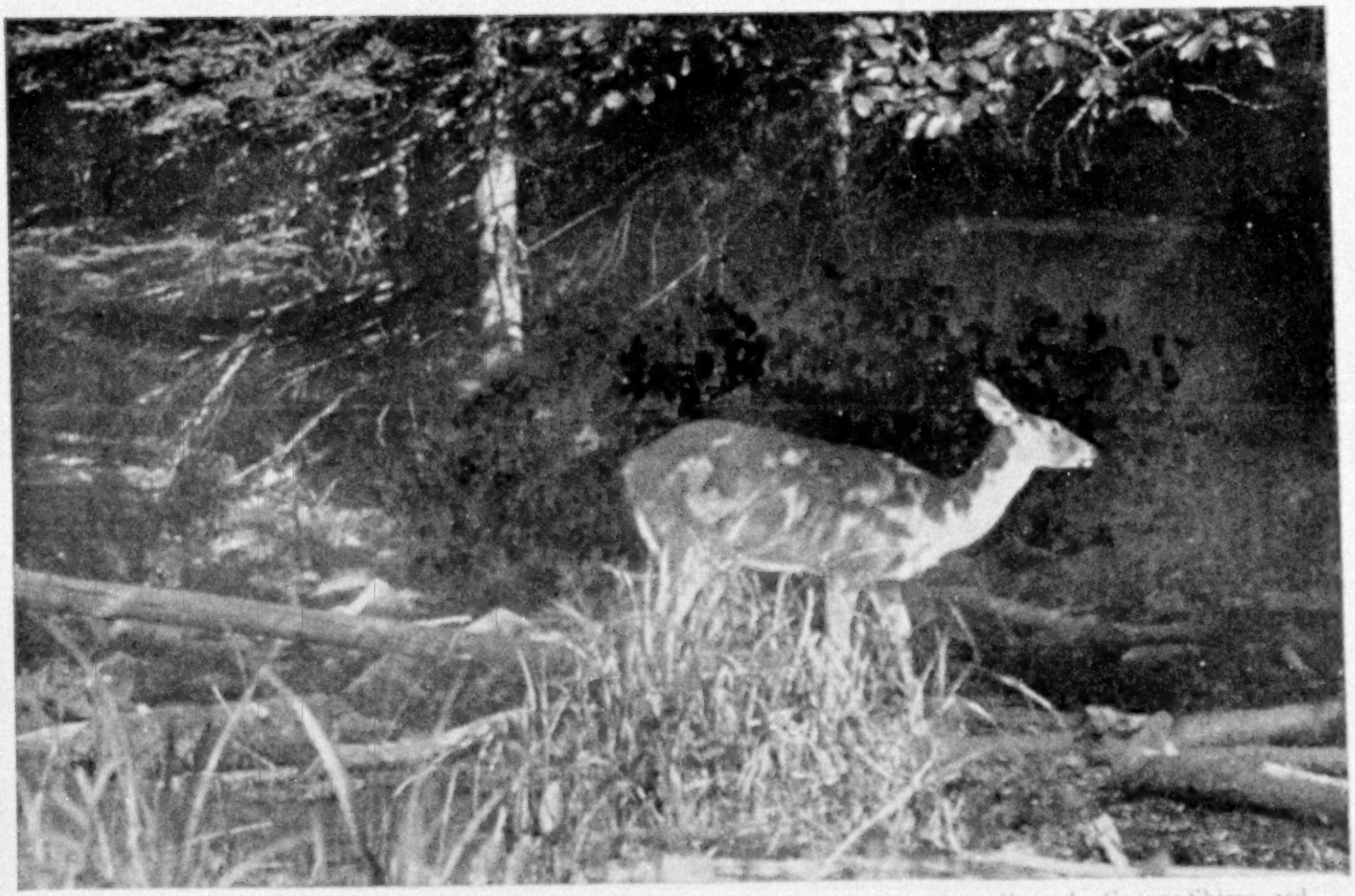

Photo by George Shiras, 3rd

A DOE MOTTLED BY INTERCEPTED SUNLIGHT

"The need of sunlight and the fact that a passing cloud or the shifting light may throw the deer in heavy or broken shadows is one reason why a camera set out at night with the flashlight is often preferable" (see text, page 772).

titude and action. An example of this was shown by an article in this magazine several years ago, illustrating the nightly visits of the same coon to bait placed at the edge of a little lake.*

In taking a picture from a canoe by flashlight one must be able to judge short distances accurately in order to have the animal in proper focus. In a different way, but for the same reason, it is equally important that automatically taken pictures should come within the focus for which the camera was set in advance. With the bait placed at a given distance, little trouble arises, but when the animal sought is a deer or a moose coming to the water or feeding grounds, the problem becomes more difficult, because the intercepting string must be touched at the point where the animal will be in sharp focus.

Whenever animals are traveling on a well-defined runway, a string running to a stake on the opposite side will insure a good picture, because the camera can be previously focused on the runway; but if such animals are to be photographed when wandering along the shores of a pond or traveling in a creek bottom, it is important that natural conditions be taken advantage of, so that the animal will be forced to pass at a fixed distance from the camera, as will be the case where the shore is narrowed by drift-wood, rocks, or mud-holes.

Quite often temporarily erected obstructions will accomplish the same purpose, provided no scent is left and the material used is in harmony with the surroundings. Otherwise, in order to avoid having the camera sprung at a point where it is not in focus, the string can be run along the ground and then raised a foot or two high by forked sticks at the spot where the animal is most likely to pass.

* See "A Flashlight Story of an Albino Porcupine and of a Cunning but Unfortunate Coon," NATIONAL GEOGRAPHIC MAGAZINE, June, 1911.

Photo by George Shiras, 3rd

NIGHT PICTURE OF WHITE-TAIL BUCK AND DOE

Beyond the ridge was a large, white pine log, where the camera and flashlight were set, the string running to a pine opposite. Flash probably fired by the doe

Usually I encamped near enough to hear the report of the flash, but sometimes it may be set many miles away, or perhaps I am in town or on a side trip, in which case it has not been unusual for the camera to remain unvisited for a week or ten days. But this is of little consequence; for, with the shutter opening and closing automatically, the exposed plate is safe until called for. On pages 767 and 768 are a couple of pictures of deer taken when I was many miles away.

PHOTOGRAPHING THE WHITE-TAIL DEER

The alphabet for the beginner in wild-life photography usually comprises nesting birds of the neighborhood, chipmunks, the lazy and sun-loving woodchuck, or the stolid porcupine, and even then many difficulties confront the novice, the overcoming of which opens the door for picturing rarer or more active subjects.

Some who take up camera hunting become discouraged by early failures and are unable to see how such an instrument can ever be a satisfactory substitute for the sportsman's gun. Others, with their interest only intensified by defeat, continue on until won over by the attractiveness of a contest where success costs no life or an awkwardly handled camera leaves no wounded animal to die a lingering death.

XUM

Photo by George Shiras, 3rd

A WHITE-TAIL DOE

Here a fallen tree narrowed the runway along the shore, so that the deer was sure to be in focus when the flash was fired

My first photographic efforts, however, were directed toward big game animals and began many years ago (1887), when quite satiated with the conquests of the gun and the regrettable recollection that success meant a more or less painful death of some timid animal, whose body was usually unnecessary for food and whose horns or hide had become superfluous trophies no longer justifying deadly pursuit.

That I should have begun by trying to photograph such a wary creature as the white-tail deer had an explanation in the fact that this animal had been my favorite quarry with the rifle, and having hunted it from my youth I knew its habits well, thereby appreciating its resourcefulness in avoiding danger. No member of the deer family is harder to photograph in the daytime, although it is the most abundant and widely distributed member of its kind.

Naturally I was confronted with many obstacles, mostly due to ignorance of photography, and had I not been the fortunate possessor of a good lens at the beginning and one of the first hand cameras made in this country, it is likely this pastime would have lost an ardent advocate. Persistent pursuit and the trial of many methods finally suggested ways of getting pictures with ease and certainty, for in the end few wild animals can escape the gun, trap, or the camera when hunted with care and energy.

The white-tail deer has a wonderfully keen ear and an equally keen nose and its eyesight, as with most of the deer tribe, is not of a particularly discriminating kind, yet the slightest sound or scent will result in an accurately directed glance toward the source of danger, and then it is useless to try for a picture, although the animal may be within fair range of the rifle.

Photo by George Shiras, 3rd.

A DOE THAT TOOK ITS OWN PICTURE A DOZEN TIMES

"After taking the third picture, it was impossible to get the deer to spring the flashlight; for, although unquestionably the black silk thread was invisible at night, a slight pressure on the upper limbs was noticed immediately and the deer retreated. The abundance of porcupines and rabbits prevented placing the thread closer to the ground. To meet this difficulty, the leaves of a freshly cut bush were saturated with salt water, and when the deer pushed into it the pressure of the thread was unnoticed until too late" (see text, page 777).

DAYLIGHT PICTURES

As daylight photography of deer usually requires direct sunlight, with the animal free from interfering brush, it is easy to understand how a close approach on foot is difficult, although in a canoe one may frequently surprise a deer at a short bend in a stream or often get excellent pictures at close range when hiding in a favorably located blind.

Such pictures of deer are best obtained in the early summer months, when seeking their favorite aquatic plants or going to water-courses to escape the flies. Then they are easily located and can be taken in exposed situations, where the illumination is good and no brush or trees cut off the view of the camera.

It was not long after discovering the difficulty of getting within photographic distance of deer, whether in a canoe or on foot, that the idea suggested itself of concealing a camera 25 feet from a runway or near a narrow portion of the shore, so that a thread running from the shutter to a stake, tree, or log would result in a picture if any animals passed by. Even then, when one might be miles away, the lingering scent from the much-handled and near-by camera required the wind to be favorable when selecting a place. Elk, moose, or caribou will push against and generally break an intervening thread, but a white-tail deer in many cases will retreat the instant it feels the slightest pressure on the breast

Photo by George Shiras, 3rd

THE SAME DEER BRINGING HER FAWN TO THE WATER, WHEN THE LATTER LEARNS OF FLASHLIGHT PHOTOGRAPHY

"Seven pictures were taken in 60 days, when came the best surprise of all; for one night the doe brought her half-grown fawn to the river, and with little concern the latter walked into the flashlight string just as the doe came into view; but even then the instinctive effort of the fawn to avoid the sharp pressure of the thread is shown by the fore right leg being thrown against the body" (see text, page 777).

XUM

Photo by George Shiras, 3rd

ANOTHER NIGHT THE DOE FIRES THE FLASH AND THE FAWN LOOKS ON WITH INTENSE INTEREST

"Ten days later the doe walked into the thread in a mass of loose branches, and it, too, threw back its leg in the same way; while the fawn, with all the appearance of knowing that there was apt to be trouble in this locality, is shown gazing in an expectant way at its mother" (see text, page 777).

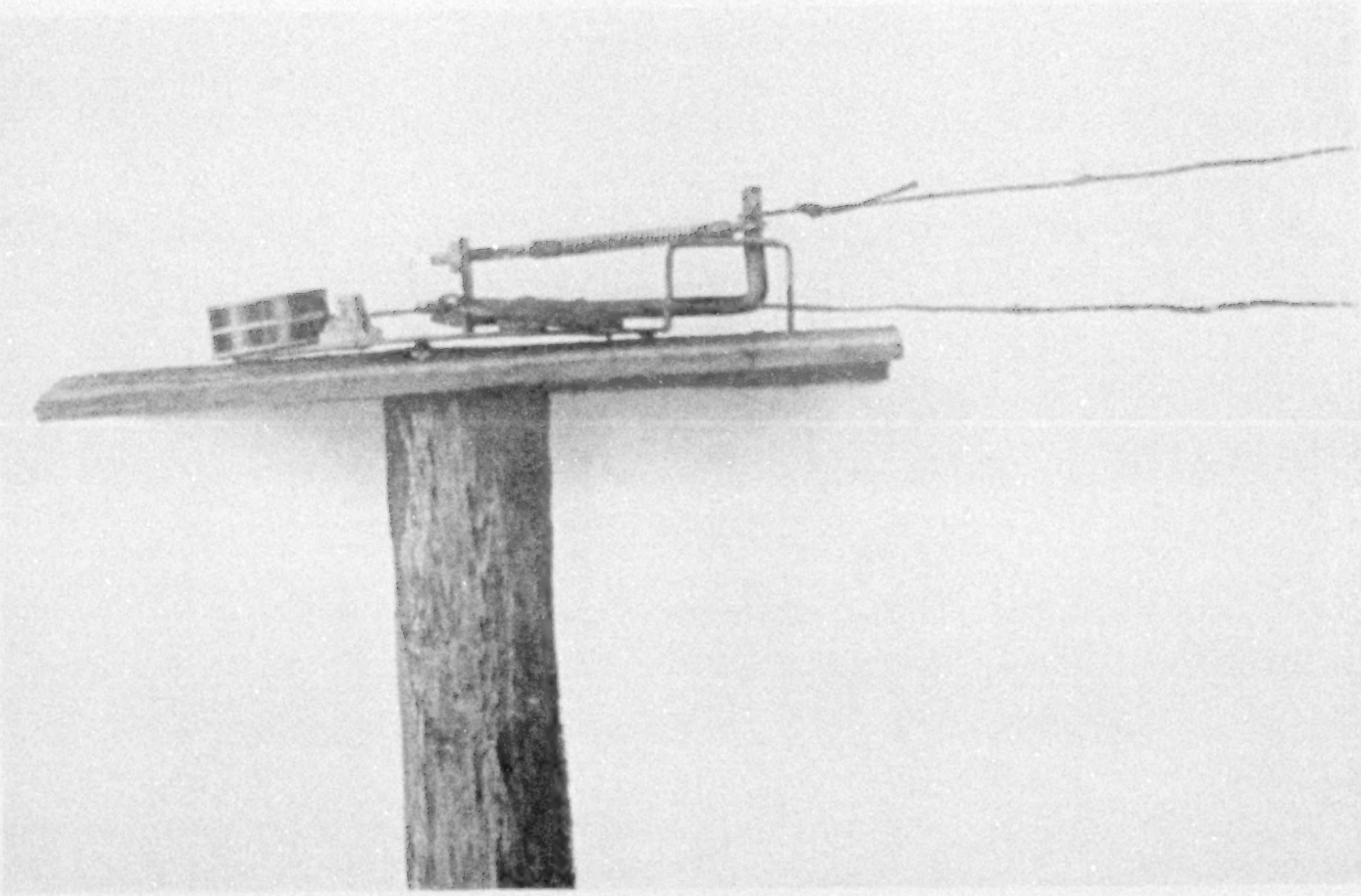

Photo by George Shiras, 3rd

HAND FLASHLIGHT MACHINE CONVERTED INTO AN AUTOMATIC ONE

The upper string runs to the shutter; the lower one, connected with the trigger, is baited at the other end or extends across the runway. The round pasteboard box contains the powder. This apparatus was patented by author in 1893 and thereupon dedicated to public use.

or upper limbs. To photograph a deer the line must be close to the ground, where it may be often overstepped or be in the way of a wandering porcupine (see page 816).

When, however, deer are in a playful mood or rushing through the water or along the shore to escape the flies, they are unable to check themselves on touching the thread and the result is a picture full of action (see page 765). By throwing a handful of salt on the beach and running the thread across the spot, it is easy to get pictures of the animals pawing the earth in search of the salt (see page 764). The need of sunlight and the fact that a passing cloud or the shifting light may throw the deer in heavy or broken shadows is one reason why a camera set out at night with the flashlight is often preferable (see page 766).

NIGHT PICTURES OF DEER

It now seems strange to recall the time when it was considered sportsmanlike to kill big-game animals at night by means of a jack-light in the bow of a canoe; yet when I first began shooting deer in the early 70's, "fire-hunting," as it was then called, was not only deemed entirely proper, but a very agreeable diversion, being the usual method resorted to in getting a supply of venison when camping near small lakes or sluggish streams, and especially if still-hunting during the day had proved unsuccessful.

Copying this method from the Chippewa Indians, then the principal tribe on Lake Superior, the light I first used was a crude affair, made by burning pine pitch in an old frying-pan, with pieces of birch bark added when about to shoot. As the rays of such a light were not concentrated and affected somewhat by smoke, the deer were usually shot within a circle of 50 feet or less. Later I used a small lantern, with a good reflector, and as experience soon showed that a deer had little chance of escaping a charge of buckshot, my

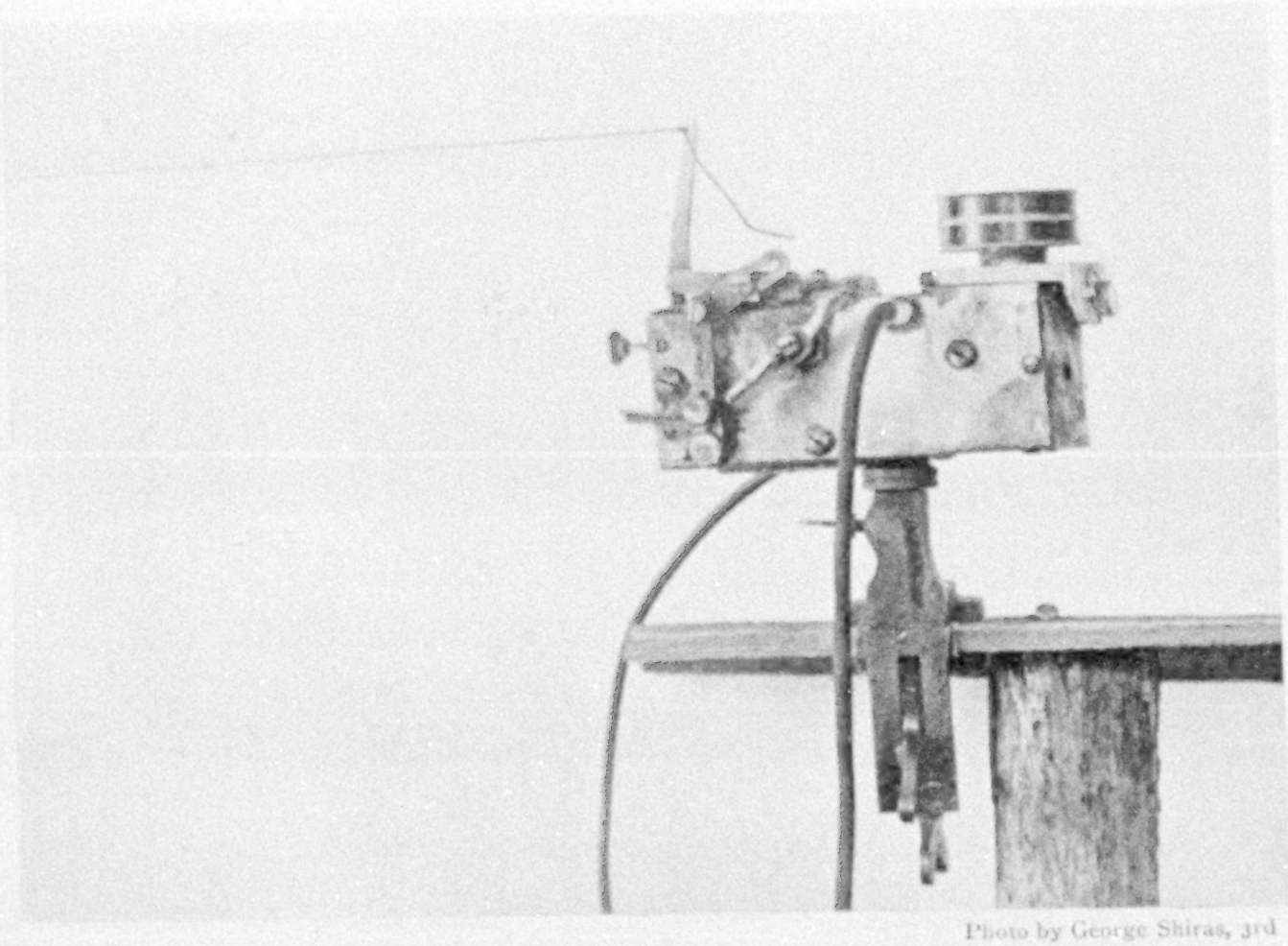

Photo by George Shiras, 3rd

THE AUTOMATIC FLASHLIGHT APPARATUS IMPROVED BY AN AIR PUMP

The pump operates the shutters of one, two, or three cameras as the flash is fired. Patented by the author's guide, J. H. Hammer, in 1903. A picture of this apparatus in use is shown on page 801. The author considers this the most reliable method yet devised.

equally young shooting companion and I agreed to only use a rifle, just as a little later we spared does and fawns in night shooting. With the opening up of northern Michigan by several lines of railway came the market-hunter, and so destructive was his use of the jack-light, both in a canoe or as a headlight on a blazed trail—many killing 100 to 200 deer in the early fall months—that it soon became apparent, in the absence of prohibitory legislation, the deer were doomed, especially since most of those killed at night were does.

Before any legislation had prohibited fire-hunting in Michigan I had given it up and assisted in the movement to end such slaughter.

Still later, when the time came that I preferred hunting with the camera, I often felt how unfortunate it was, after an unsuccessful day with the camera, either by reason of cloudy weather or inability to locate any deer, that I could not go out after dark and get deer pictures under the jack-light with the same ease that I formerly got their carcasses.

Then, too, there is a peculiar and never-ending fascination in canoeing at night, when the evening stillness brings to the keen ear the crooning of the porcupine, the chirping of the cricket, the gentle croaking of the frog, or the soft flutter of an owl circling on wings of velvet. When a muskrat jumps off a log or a pickerel in the shallow water darts against the side of the boat, one gives an involuntary start at sounds magnified a dozen times by the high tension of the watcher. To the straining eye of the one in the bow, confined to the diverging avenue of light cast by the jack-light revolving on its staff, the overhanging branches and the bleached or gnarled trunks assume weird shapes, and when finally there is detected the intermittent swish-swish-swish of a deer wading knee deep here and there in search of tender roots, one tries to pierce the darkness ahead for the first faint

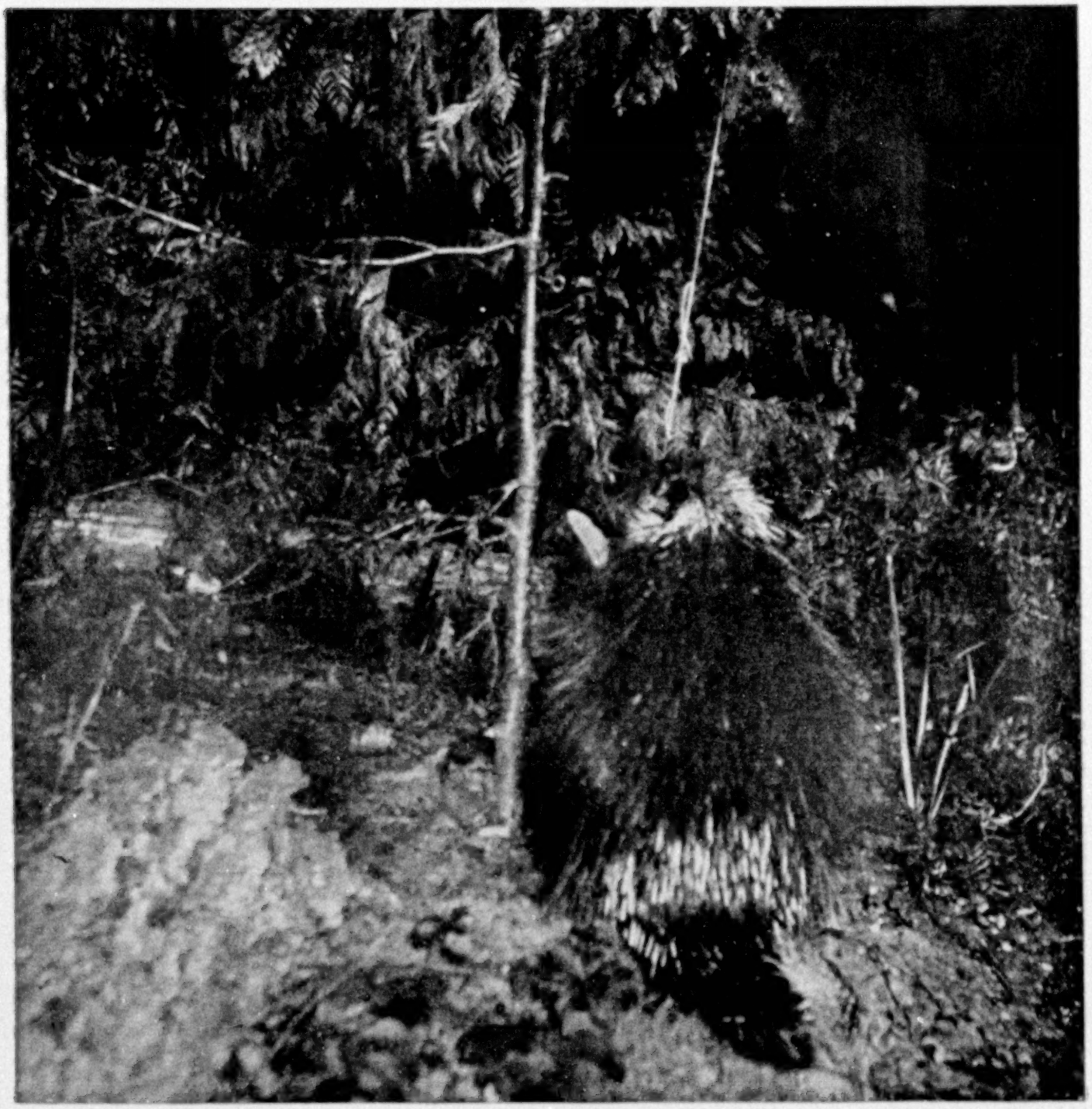

Photo by George Shiras, 3rd

A PORCUPINE FIRES THE FLASHLIGHT

Attracted by a bone saturated with salt water, a big, black "porky" is shown pulling on the string (see page 779)

glimmer of the lantern light, reflected like balls of fire in the eyes of the suspicious deer. And then sometimes the novice, seeing the momentary glow of a firefly or the glistening dewdrop on the reeds, imagines he sees a shadowy form and fires at the apparition. When, however, the blue, translucent glow of the watching eyes appear, and the approaching gray form grows into the graceful image of a deer, the time has come when the gun or flashlight breaks in on the stillness of the night and the implement used determines whether one prefers the bloody carcass and its transient use or a picture that will live long after the pursued and the pursuer have passed away.

In the first use of the hand flashlight I met with many adventures and much ill-success, due to the slow magnesium powder then manufactured and the still slower means of ignition—methods that were fairly satisfactory for interior pictures, but useless on damp or windy nights, when the flash had to be fired the instant the deer came in focus and with

Photo by George Shiras, 3rd

THEN CAME A LIGHT-COLORED PORCUPINE (SEE PAGE 779)

This animal was of a yellowish-white hue and may have been a descendant of the albino porcupine described by the author at length in a previous issue (see NATIONAL GEOGRAPHIC MAGAZINE, June, 1911.

the same quickness as a gun. Some deer ran away just when I ignited the powder, and others staring at the lantern light gave a convulsive movement of the head the instant the slow powder exploded, so that all such pictures were worthless, though I thoroughly enjoyed the effort of getting within 25 feet of a feeding deer and the excitement both aboard the canoe and on shore when the spluttering flash went off.

Gradually I constructed an apparatus that could be fired with ease and certainty, and as the speed of the powder was improved all difficulty vanished in getting night pictures from a canoe.

DEER THAT TOOK THEIR OWN PICTURES AT NIGHT (see pp. 767-768)

The white-tail deer, unlike moose and elk, will rarely face a jack-light again at close range when once it has been shot at with a gun or flashlight, for it associates the explosion in either case with the innocent lantern, and when this light is once more seen approaching across the

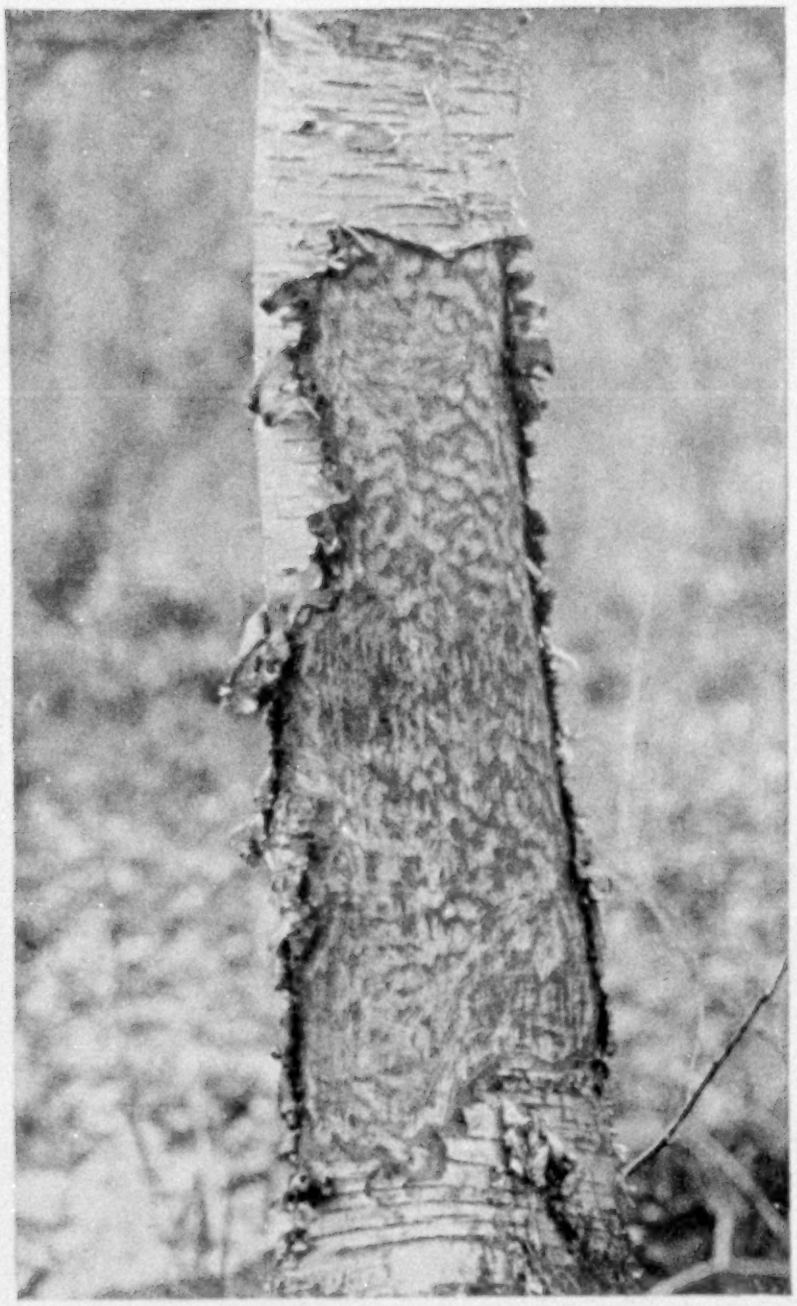

Photo by George Shiras, 3d

TREE TRUNKS SEMIGIRDLED BY PORCUPINES

The author's more recent investigations sustain the theory that the porcupine avoids killing mature trees by eating all the bark about the base. It took the animal three days to eat the bark on the above tree, and then it went to the adjoining one, where it was equally careful in removing the bark. Note how the inner wood shows the broad teeth-marks of the animal (see page 781).

dark waters or coming through the woods, it bounds off snorting or quietly skulks away before one gets within range.

This form of night photography, therefore, in addition to being a bloodless sport, has doubtless saved the lives of many deer that otherwise would have fallen before the deadly gun of the numerous headlight hunters. On several occasions I heard some of these chaps complaining about the difficulty of getting within gunshot of deer in the neighborhood of White Fish Lake; but the reason for this was never explained to them.

Finally, when most of the deer near camp became sophisticated and would not tolerate a jack-light, and again because there were times when the full moon rendered the artificial light useless, or because deer often fed in localities not accessible by canoe, I concluded to put the flashlight out after dark in the hope that it would prove as successful as the set camera in the daytime.

With but very little change in the hand flashlight, it was converted into an automatic one, and so adjusted that the slightest pull of a string would fire the flash, the shutter opening and closing simultaneously (see page 772). This was the beginning of the automatic flashlight and led to a much more diversified use of the camera at night.

A DEER THAT TOOK ITS OWN PICTURE A DOZEN TIMES

Perhaps the most interesting experiment I have made with a set camera occurred when I endeavored to get a series of pictures of the same deer—an effort that was accomplished under conditions favoring the trial. On a stream not far above camp an old doe was in the habit of coming to the water nearly every night to feed upon a succulent form of water grass growing at that point. It would not stand the jack-light and rarely appeared before dark.

So, clearing space in the alders and throwing out some cabbage leaves and turnips, well sprinkled with salt, it was not long before their disappearance and the clear-cut hoof tracks explained the reason. Then an empty, well-weathered box, with a hinged lid, was placed on a log, and there it remained until the deer fed without suspicion. Cutting a round hole in the box, the camera was placed therein and a string from the flashlight

Photo by George Shiras, 3rd

A MUSKRAT PULLING ON A CELERY ROOT

During several seasons, by automatic camera and flashlight, a large number of night pictures were taken of muskrats, which are not easy to photograph in daytime, as they are largely nocturnal or abroad only toward dusk (see text, page 782).

stretched across the feeding place. Water was dashed wherever any trace of scent was apt to be, and that night came a flash, visible from my bed-room window. A good picture resulted and the camera was reset; but nothing came for nearly 10 days, when once more a picture of the same deer was taken. This time no effort was made for another picture, but the place was kept well baited, until from a canoe I could see fresh tracks in the mud, when the camera was once more placed in the box.

After taking the third picture it was impossible to get the deer to spring the flashlight; for, although, unquestionably the black silk thread was invisible at night, a slight pressure on the upper limbs was noticed immediately and the deer retreated. The abundance of porcupines and rabbits prevented placing the thread closer to the ground. To meet this difficulty, the leaves of a freshly cut bush were saturated with salt water, and when the deer pushed into it the pressure of the thread was unnoticed until too late. The flash shows the deer nibbling away (see page 769).

Seven pictures were taken in 60 days, when came the best surprise of all; for one night the doe brought her half-grown fawn to the river, and with little concern the latter walked into the flashlight string just as the doe came into view (see page 770); but even then the instinctive effort of the fawn to avoid the sharp pressure of the thread is shown by the fore right leg being thrown against the body. Ten days later the doe walked into the thread in a mass of loose branches, and it, too, threw back its leg in the same way; while the fawn, with all the appearance of knowing that there was apt to be trouble in this locality, is shown gazing in an expectant way at its mother (see page 771).

XUM

Photo by George Shiras, 3rd

A MUSKRAT WHO IS BEING INTRODUCED TO CARROTS AND LIKES THEM (SEE PAGE 783)

FLASHLIGHT OF DOE AND TWIN FAWNS

The picture of the white-tail doe and two fawns, appearing as the supplement, is an example of night photography from the bow of a canoe, and is intended to serve as a contrast to the series taken by automatic means in the accompanying article. Therefore a brief description of how this picture was taken may be of interest.

One quiet, warm evening early in July, 1896, the canoe left camp for the south end of Whitefish Lake, where it was reasonably certain several deer would be found on arrival or after a short wait. On the way I suggested crossing the lake to look for a deer in a little bay where an old and long abandoned logging road came to the shore, between high bluffs, and the only place accessible for deer coming to the water in half a mile.

When the jack-light began to bring in faint relief the shores of the bay we saw a pair of glowing eyes, but before the body became distinct the deer gave a snort, and running up the trail a ways, stopped. Backing the canoe off a short distance, the animal finally returned to the water; but as the light came nearer it bounded off again. This performance was repeated several times, indicating pretty clearly that the animal was one I had flashed before, or was one that had providentially escaped a load of buck-shot fired by a pot-hunter using a head-light. Growing discouraged, I gave the signal to continue down the lake; but the guide, believing the deer would soon grow less suspicious, held the boat a few minutes longer.

Suddenly, on the right, I heard the tell-tale ripple made by a deer entering the water, and turning the jack-light in that direction, was surprised to see three pairs of glimmering eyes. On a nearer approach I was delighted to see a large doe and two beautifully spotted fawns—a picture long and hopefully wished for. The mother deer was feeding on a plant common in such waters, while the fawns romped about with an abandon indicat-

ing a dependence upon a milk diet. When within 25 yards the doe became restless under the light and turned up the shore toward the old lumber road; but the fawns, apparently enjoying the illuminated shore, ran to and fro in a way to prevent getting the entire group on the small plate.

With great anxiety I awaited the moment when the three would come in closer proximity, and several times was greatly tempted to fire the flash when the doe and one fawn were in a good position. Just as the doe reached the trail and when I feared that in the effort to get the three all would escape, the fawns ran in behind their mother, preparing to follow in her clearly intended retreat; so I gave a shrill whistle, the finger resting on the trigger of the flashlight for instant action. The fawns turned broadside as the mother stepped ashore and in open-eyed amazement gazed at the round ball of fire, which had hitherto been so silent. Bang! went the flash, and a great tongue of flame and a column of white smoke ascended to the top of the trees.

Opening my left eye, which had been purposely closed when the blinding flash was fired, I saw the doe running up the trail, while the fawns, directly facing the dazzling flame, were temporarily blinded and jumped about in great confusion: one finally struggled up the shore in collision with brush and projecting logs, while the other jumped into the water and headed directly for the canoe, dimly seeing a lighted way in front of the jack when all else about was dark and impenetrable. As it passed by I seized it gently by the slender neck, whereupon the guide, who had a long standing order for a young deer, asked me to pull it aboard; but the thought of a capsize, with the loss of a negative more valuable to me than the prize money in sight for the guide, and the thought, too, of separating forever these frolicksome twins, led me to turn the swimmer ashore. And when we returned an hour later, the absence of bleating cries showed the family reunited, but doubtless still in a state of wonder at a whistling moon which had blown up in such an unexpected and terrifying manner.

HOW PORCUPINES TOOK THEIR OWN PICTURES

Having in a previous issue described the habits and range of the porcupine,* reference now will be confined to the manner in which the accompanying pictures were taken (1912), with a few additional observations upon the alleged instinct of the animal in never completely girdling the base of the tree when feeding on the lower bark.

Where porcupines are abundant they are easy animals to photograph. On five occasions I even got their pictures at night on the same plate with deer. But any effort to coax such a stolid, tree-inhabiting rodent to take its own picture by flashlight, and at a spot where the camera must be placed more or less at random, presented something of a problem. Subsisting almost exclusively upon the bark, twigs, and leaves of certain trees, including particularly, in the fall, the needles of coniferous ones, like the hemlock, this animal is not often found seeking ground food except in the summer, when it visits ponds and lakes for aquatic plants. Consequently months might pass without a picture if the bait used consisted of the common form of vegetation found throughout its range. Like most rodents, however, the porcupine enjoys gnawing the bones or shed antlers of wild animals, and also has a keen relish for any substance impregnated with salt. Therefore it seemed to me there could be found no greater attraction than a salted bone. The two big "porkies"—one unusually light-colored, the other unusually dark, with a bone between their uplifted paws, tell the story of the effort (see pages 774 and 775).

Having heretofore only casually noticed the manner in which trees were barked by porcupines, I had reached no definite conclusion thereon; so when last fall, while looking for a good place to

* See "A Flashlight Story of an Albino Porcupine and of a Cunning but Unfortunate Coon," NATIONAL GEOGRAPHIC MAGAZINE, June, 1911.

XUM

Photo by George Shiras, 3rd

THIS MUSKRAT TOOK POSSESSION OF THE CAMP CARROT PATCH. ROUNDED UP BY USE OF A BROOM (NOTE UPPER LEFT-HAND CORNER), IT WAS PHOTOGRAPHED AT CLOSE RANGE (SEE PAGES 783 AND 784)

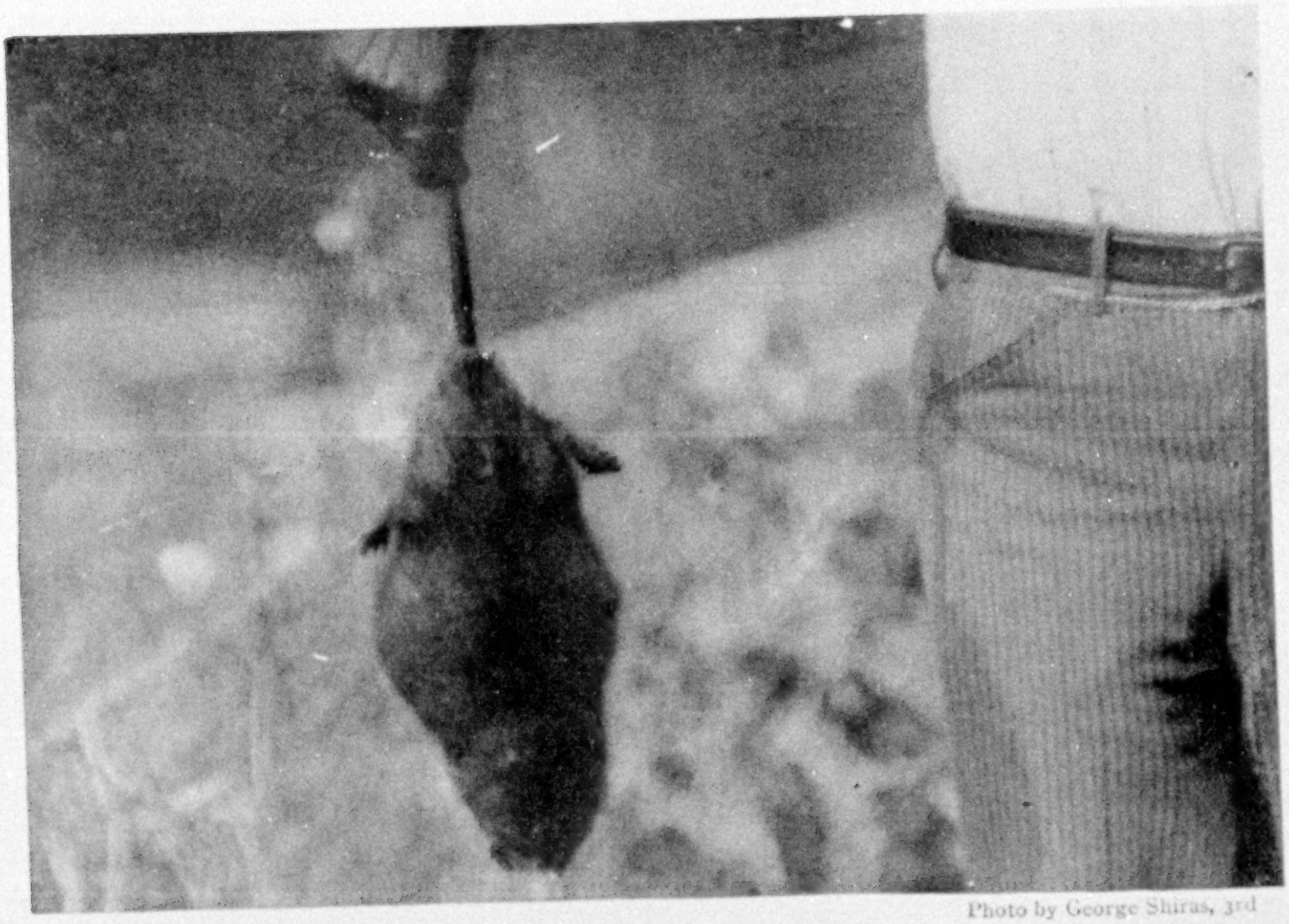

Photo by George Shiras, 3rd

SEIZED BY THE TAIL, IT WAS HELD ALOFT FOR THE PURPOSE OF SHOWING ITS EVER-INCREASING GIRTH (SEE PAGE 784)

set out the camera, I found a compact area where the majority of certain mature trees had bark eaten from the trunk, I carefully examined and counted them as follows: 18 silver birches, 5 elms, 4 maples, 3 each of white pine and hemlock. Not one of the numerous balsam trees had been touched. In only two instances were the trees completely girdled, and in each case in different years, the last animal either not realizing it was killing the tree or not noticing the old cutting. In the same neighborhood the upper and terminal limbs of a number of young pines were denuded of bark, and in several cases the trees were dead or dying.

The strong teeth of the porcupine are admirably adapted for removing the heavy bark, and, as in the case of the beaver, this animal can chisel out large pieces. The picture on page 776 shows how cleanly the bark was removed and eaten, the inner wood showing plainly the scoring made by the flat teeth and how carefully the animals avoided removing more than half the bark.

MUSKRATS AND THEIR HOMES AND HABITS

While the steady advance in the value of muskrat skins has led many a trapper who was wont to pass them by to put them on his list of desirables, these animals withstand onslaught better than any other of the fur-bearers, due to their fecundity and wide distribution rather than any ability to elude capture.

Every frequenter of the wilderness, as well as the watchful ruralist, is familiar with the swimming figure of this inhabitant of the marshes, and toward evening sometimes sees him waddling along the banks or astride a partially sunken log deftly opening mussel shells—about the only flesh sought by this aquatic rodent. Often muskrats are more abundant in the marshes of a partly settled district, where the mink and other enemies have been long ago eliminated and where the farmer boy, rather than the professional trapper, has been its only enemy; but its greater relative abundance and the increasing value of the pelt makes it now well worth the effort of the skillful trap-

XUM

Photo by George Shiras, 3rd

THE GLUTTON'S END (SEE PAGE 784)

The same muskrat seizing carrot at edge of the dock before the author could get more than a few feet away from exploding flash. In this picture the animal resembles a miniature grizzly bear. A few days after it died, probably as a result of its carrot debauch.

per to visit the marshes bordering civilization, and soon it will be numbered among the missing or the rare in many parts of the country.

Largely nocturnal or abroad toward dusk, and then usually in the water, the muskrat is not an easy animal to photograph in daytime. In the summer of 1910 I concluded that an animal which was so abundant and which had heretofore refused to pose for a picture must be sought systematically and with due care.

Naturally night pictures, with the aid of the baited string, was the plan in mind, and the only question of importance was the kind of bait likely to coax the animals out of water and in a place where the camera could be set and easily examined. As an experiment, celery was put on the logs near the runways, or close to the entrance of the summer homes, in the banks of a stream and marsh near camp. The following night the celery had disappeared; thereupon four stakes were driven in the water opposite a log from which the bait had been taken, while a board was placed on top for the support of the camera. Another and heavier stake behind held the flashlight apparatus, and from it ran a string to and through an eye-screw in an overhanging branch, with a piece of celery attached to the end. That night the exploding powder was heard and the developed plate showed a chunky muskrat reaching up for the bait (see page 777). Every night thereafter the muskrats came, regardless of weather, and a good set of pictures soon resulted.

Two seasons later more muskrat pictures were taken, but mostly for the purpose of showing their recently constructed winter homes. Instead of celery, carrots were substituted, being taken from a large bed in front of the cabin. Thereafter every muskrat in the vicinity became reckless with delight, and long before dark the flash would be prematurely fired, necessitating setting it out

Photo by George Shiras, 3rd

FLASHLIGHT OF A MUSKRAT BUILDING ITS WINTER HOME IN THE MARSH (SEE PAGE 782)

after dusk. Sometimes the canoe would not get away more than 50 feet before the explosion came, showing that the expectant animals were watching near by. After taking many pictures, the camera and flash were set out for rabbits in a little swamp near the stream, and I wondered what the muskrats would think of this change.

DID THIS MUSKRAT EAT HIMSELF TO DEATH?

But I was not left long in doubt, for in a few days a particularly large muskrat was seen leaving the stream, and in the bright sunlight it waddled up the trail toward the carrot patch, where he proceeded to pull up a carrot, and returned to the water. Considering this a good opportunity for a daylight picture, I went to the cabin for the camera, and, returning, seated myself within a few yards of the trail, with a carrot placed temptingly in the way. After waiting, and when no animal appeared, I examined the carrot patch and found that he had come while I was after the camera.

The guide thereupon got a broom for

XUM

Photo by George Shiras, 3rd

WINTER MUSKRAT HOUSE ON THE RIVER BANK HELD SECURELY IN PLACE BY THE BUNCH OF ALDERS

Note the carrot dangling just above the muskrat. Flashlight (see page 785)

the purpose of driving the muskrat out into an open space where it could be photographed to better advantage—a proceeding it resented with some vigor by biting off the ends of the wisp (see page 780). In the effort to round him up he was upset, but he had become so fat and unwieldy that it took several trials to regain his footing. When right side up, with a gloved hand he was seized by the tail and held aloft while the camera snapped again (see page 781).

Replaced on the ground, he headed for the water, but on discovering the carrot in the trail, he seized it without signs of fear and dragged it down to the water's edge, where he disappeared under the dock. Late in the afternoon the flashlight was set upon the path near the water, and at dusk, just as the bait was being tied on, I saw the dim figure of the muskrat coming out of the creek and headed for the carrot; so, giving a warning cry, we rushed away just as the flash exploded (see page 782).

For many days thereafter this animal ate and dozed alternately in the carrot bed, and one evening I saw him at the edge of the bank with a large carrot, out of which he would take a bite and then his eyes would close; and then in a moment he would nibble again. He had now grown fatter than a woodchuck. The morning following this my attention was called to the animal's head sticking out from under the dock, and for the first time he did not seem to be interested in carrots. Examination showed him to be as dead as a mackerel, and his days of gluttony were over.

WINTER HOMES OF THE MUSKRAT

The time of year had come when the old and the young muskrats, lacking a warm home within reach of open or running waters, must provide a new one in

Photo by George Shiras, 3rd

AN EARLY WINTER VIEW OF THE SAME HOUSE, WITH THE MUSKRAT GETTING ITS FINAL CARROT (SEE TEXT, PAGES 784-785)

advance of the northern winter. About White Fish Lake most of these animals seemed to have quarters habitable throughout the year, but about 10 per cent built the usual dome of reeds and mud in the marshes at the inlet and outlet of the lake, where the running waters prevented ice forming to the bottom, while another 10 per cent erected a substantial upper-story over their summer homes in the river bank. Night views of these different structures appear on pages 783 and 784.

Early in November, before ice formed on the stream, a final flashlight picture was taken of a muskrat climbing his snow-covered house for a farewell bite at a carrot, the welcome odor of which had penetrated the cozy home and given notice that the prospective meal would be illuminated by a burst of light, affecting his vision for the moment, but not his appetite.

MOTHER MUSKRAT CHASES A MINK

Once while watching for deer from a tree overhanging the water, I saw five young muskrats sunning themselves on a near-by log, while the mother swam about in a watchful way. Suddenly she gave a squeak and a flap of her tail; whereupon the youngsters tumbled off into the water and, diving, disappeared in the hollow end of the log, followed by the parent. Looking about for the cause of alarm, I saw a good-sized mink peering through the brush where the inner end of the log was embedded in the bank. Satisfied that the only chance for an immediate meal lay in submarine operations and possibly not knowing a protector was at home, the mink glided into the water and, without a moment's hesitation, dived out of sight at the entrance to the log, leaving me in the belief that the purpose of such a bold marauder would soon be accomplished.

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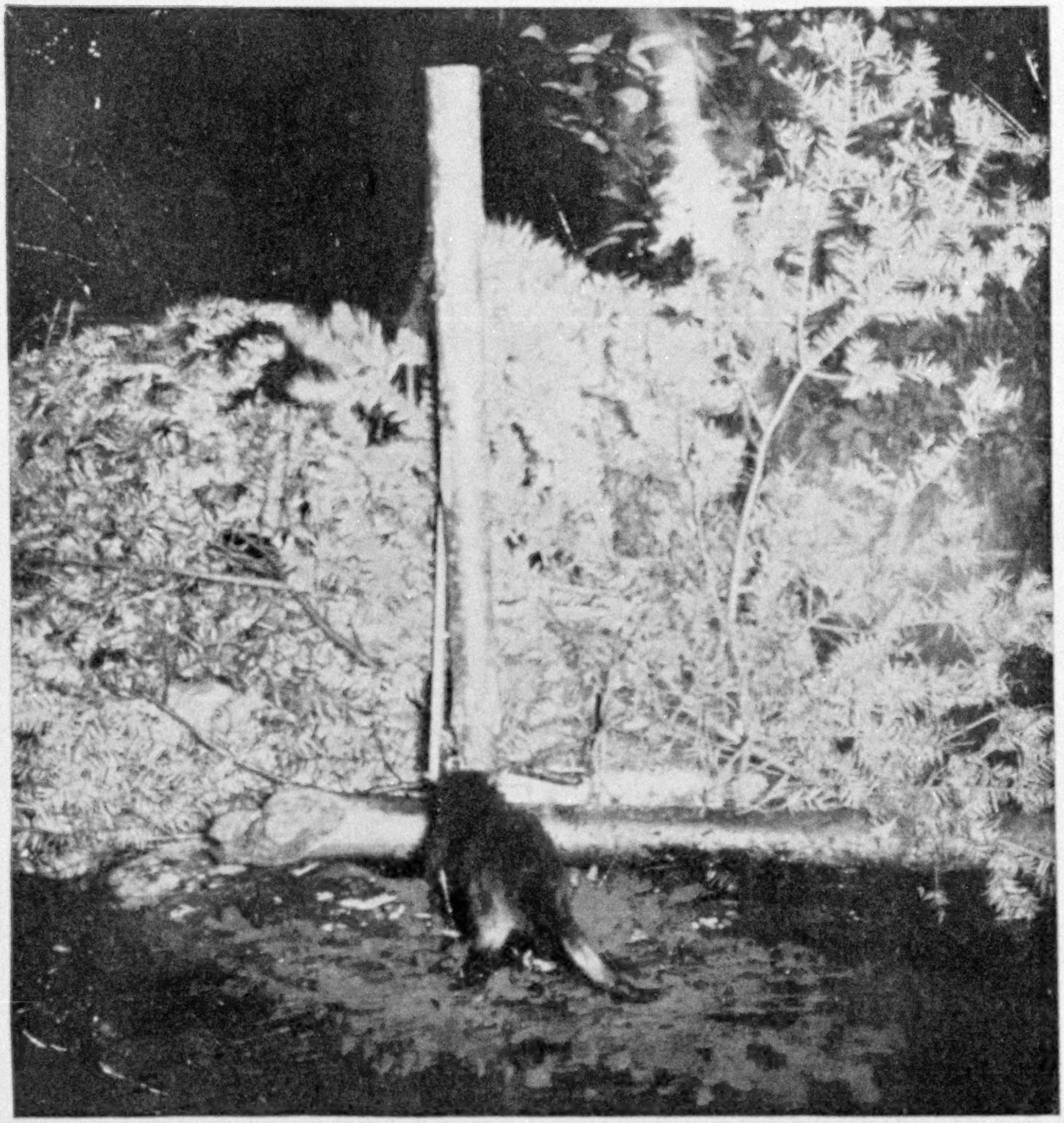

Photo by George Shiras, 3rd

A MICHIGAN MINK FINDS A FRESH FISH ON SHORE AND RECEIVES A SURPRISE (SEE PAGE 787)

Consequently I was much surprised on seeing the mink shoot to the surface and put for the shore just as the mother came in sight in angry pursuit. On landing the mink ran into an opening in the trunk of the tree upon which I sat, followed by the muskrat; but no encounter occurred, for the mink came out the other side and in a quick dash re-entered the first hole. Several times this maneuver was repeated, the muskrat becoming more and more infuriated; but the mink seemed to regard the whole affair as a joke, finally running up the bank, while its antagonist, taking no chances on being lured away, sat on the shore for half an hour.

The week following I saw three young muskrats on the log, and this reduction in number doubtless meant a successful

raid while the mother was out of sight in search of food. Whether fear, gallantry, or a provident instinct in not killing the breeding female accounted for the mink's refusal to give battle, I will not undertake to say. And possibly it was this particular mink that had an encounter which it did not regard as a joke, as shown on page 786, where a mink, near the muskrat log, is pictured pulling on the fish bait just as the flash exploded.

RABBITS OF THE NORTH

The varying hare or snow-shoe rabbit does not occupy a burrow, and although it remains throughout the year above ground it is seldom seen, even where fairly numerous; for, besides living in dense swamps and thick coverts, it is largely nocturnal. I have sometimes come across the remnants left by an owl or a fox, and have often seen hundreds of tracks in a freshly fallen snow, besides on occasions snaring some for camp use, but rarely have I seen their brown forms in summer or when whitened on the approach of the winter snows. The fact that this rabbit was difficult to photograph and, moreover, was typical of the northern swamps, being a staple winter diet of the trapper, homesteader, explorer, and of many Indian tribes, led me to try for a series of pictures, even if such a humble and timid animal was not rated high on the sportsman's list.

In the near-by swamps and in the alders along the creek in front of my Michigan camp, there were supposed to be a number of rabbits; so a preliminary feast of carrots and cabbage was placed 100 yards down the stream, such proximity being an advantage in resetting the camera and flash whenever we saw the blaze or heard the report, for if the rabbits proved as indifferent to the flashlight as coons, skunks, and muskrats, it would then be possible to get two or more pictures each night.

In a few nights the vegetables were gone. Then a carrot was tied to the end of a string connected with the flashlight; but no explosion occurred the first night, because the rabbit had quietly eaten the bait without pulling on the string. Then a carrot was suspended from the ground on the trunk of a tree, requiring the animal to stand up and pull; but this made a somewhat ridiculous position, since one is not accustomed to seeing a rabbit brace its forefeet and pull for dear life.

Then a tilting board was arranged, so that when the animal stepped on it the flash would be discharged; but a few experiments showed that the visitor always seemed to come with a hop and a jump—whether of joy or suspicion I could not tell. This resulted in the animal moving during the flash or being out of focus when on the jump.

Finally, a spring pole was bent down to within a foot of the ground and a carrot tied to the end of it and to a stake driven level with the soil, so that when the carrot was eaten through the pole would fly up, pulling the string connected with the flash. One can see or imagine he sees a surprised look on the face of the rabbit as the half-eaten carrot springs into the air (see page 789).

When the fall winds from Lake Superior carried the first snowflakes, and it seemed probable the rabbits had changed from brown to white, the camera and flash were set out again. But a week passed before a visitor came, for upon the alders losing their leaves the summer wanderers had retreated to the cedar swamps. One scene, on page 791, depicts a pair, partially robed in white, nibbling at the last supper of the year, furnished from the garden of the author's camp (1912).

NORTHERN SKUNKS UNDER THE FLASHLIGHT

During the fall of 1911 I spent 10 days at my house-boat on White Fish Lake, and, as was the custom, some fish and the remains from the camp table were placed a few yards back in the forest for the enticement of any wandering animal. It was in this way and in the same locality that I got my first series of coon pictures by flashlight. The second night following a visitor came and the food selected suggested a coon or a

XUM

Photo by George Shiras, 3rd

A MICHIGAN VARYING HARE, OR SNOW-SHOE RABBIT, FIRES THE FLASH

"The fact that this rabbit was difficult to photograph and, moreover, was typical of the northern swamps, being a staple winter diet of the trapper, homesteader, explorer, and of many Indian tribes, led me to try for a series of pictures, even if such a humble and timid animal was not rated high on the sportsman's list" (see text, page 787).

skunk. I then put up a light-colored plank for a background and hung the bait from it, so that the animal was sure to be in focus and its figure well outlined against the board, however dark the fur. Then at dusk the camera and flashlight were set within a dozen feet of the bait.

After dinner I sat on deck awaiting results, and about 8 o'clock I gave an involuntary start, when the bright flame and heavy report broke in on the quiet, dark waters of the little bay. But, whatever the animal, it had quietly disappeared before I came ashore with the lantern to reset the camera and the flash for another trial. Several hours later the house-boat quivered from the shock of another explosion, but I did not get up, wishing to see what the developed plates would show the next day before trying again. The first exposure was that of an adult skunk pulling sidewise at the bait, and marked with the usual dorsal strip of white and a tail of black tipped with white (see page 792). The second plate showed a skunk with a darker body and a tail almost entirely white (see page 793).

The next night it rained constantly and nothing came, for skunks dislike wet grass or dripping bushes. On the third night three flashes were fired before 11 o'clock, and the plates showed the skunk with the white-tipped tail; and this one continued to come night after night to brave the terrors of the flash. Finally, the white-tailed skunk summoned up courage for a second visit, and then came regularly. Up to this time no picture had shown the great plume-like tail of the skunk when erected for action.

But the second skunk had evidently discovered that every time it pulled on

Photo by George Shiras, 3rd

MANY EXPERIMENTS WERE TRIED BEFORE A PHOTOGRAPH SHOWING A RABBIT IN A NATURAL POSITION WAS SECURED

"Finally a spring pole was bent down to within a foot of the ground and a carrot tied to the end of it and to a stake driven level with the soil, so that when the carrot was eaten through the pole would fly up, pulling the string connected with the flash. One can see, or imagine he sees, a surprised look on the face of the rabbit as the half-eaten carrot springs into the air" (see text, page 787).

the bait attached to the string there followed a dazzling light and a heavy explosion Not liking this kind of interruption, it always raised the tail so the battery concealed beneath would be ready for instant use if the occasion required (see page 794).

Should one wish to compare the markings and the habitat surroundings of this and the southern species, two pictures of the Florida skunk will be found on pages 812 and 813.

PHOTOGRAPHING SKUNKS AT THE CABIN DOOR

Late last summer when taking night pictures of coons in the patch of corn adjoining my Michigan cabin, a developed

Photo by George Shiras, 3rd

THE FLASH SECURES A PAIR OF RABBITS AT BAIT IN THEIR BROWN, SUMMER COATS

negative unexpectedly showed a skunk pulling on a husked ear of corn that had been used as bait (see page 795). Thereafter the coons disappeared, whether because the supply of corn had about given out, or because the combined presence of skunks and the flashlight proved too much for their constitution, I could not tell. The next afternoon, hearing a noise under the dark-room floor, I examined the outer wall where a drain-pipe passed through, and there was a fresh tunnel in the sand, showing that a skunk had selected his winter quarters. The same night a camera and flashlight apparatus faced the opening, while a string with a piece of bacon dangled from the wall.

At dinner every one jumped at the near-by explosion. When, a few minutes later, the negative was in the developer, and the image of not one but two skunks began to appear, I could hear the animals moving about almost under my feet. To have thus taken a picture of wild animals within three feet of the dark-room and then developed the plate in even closer proximity to the living forms represents an occurrence never likely to be repeated (see page 796).

On leaving camp shortly thereafter, orders were given to the care-taker to trap these undesirable tenants, and as I write perhaps some furrier is now busily engaged in converting their humble pelts into furs designated by such high-sounding names as black fox or Alaska sable. The experiences of past years, narrated hereafter, compelled such summary disposal of animals usually unobjectionable except when claiming a joint tenancy in the abode of man.

SOME ADVENTURES WITH SKUNKS

Just as a coon once, in a single night, killed all the young chickens raised for camp use, on another occasion the dead bodies of 48 half-grown chickens were found on the floor of the poultry-house, each with its throat pierced by a single incision of sharp teeth and hardly a feather ruffled, since the animal was satisfied with a few drops of blood sucked from the throat of each.

Setting the trap the next night, a half-grown skunk was caught, whose beady little eyes and shrinking body made a picture of despair. But such wholesale murder forbade clemency.*

While the skunk will usually depart at the sight of man, they are often set in their ways, when traveling a narrow path refusing to yield the right of way to one coming from an opposite direction.

* It may be stated here that there is a short period, following the withdrawal of maternal care, when the young chickens of all the broods flock together at night before they have learned to roost off the ground, and then a visit of a predatory animal is apt to be disastrous. I have often felt, however, that it is the younger of the carnivorous animals, like the youth of mankind, which are often reckless in the enjoyment of unusual opportunities.

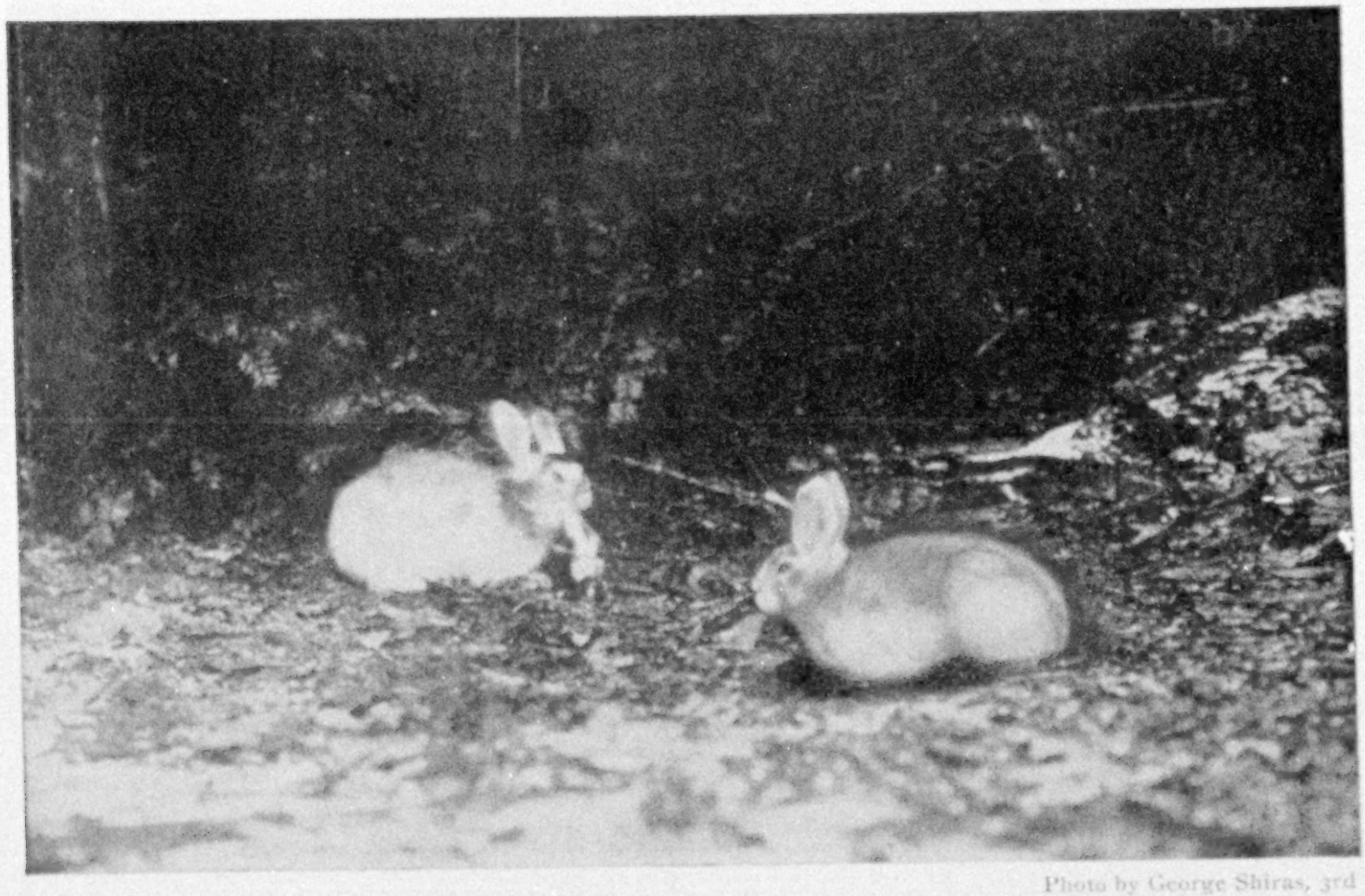

Photo by George Shiras, 3rd

NOVEMBER FLASHLIGHT OF A PAIR OF SNOW-SHOE RABBITS IN THEIR WHITE, WINTER ROBES (SEE TEXT, PAGE 787)

One evening, many years ago, while hunting deer, I was returning to camp along a railroad track where it crossed a broad, wet swamp. The road-bed had been raised above the low ground by earth taken from both sides, so that the single track was hemmed in by broad ditches filled with water. Half way across I noticed a large skunk coming toward me, and the idea of a head-on collision was not pleasant; but shooing and shouting had no effect, and on he came. At 20 feet he raised slightly to inspect me, when I tried to put a rifle ball through his head—about the only shot that will paralyze an intentional or reflex action of the scent glands. The shot missed, seemingly encouraging his desire to continue up the track; so the next ball went through the body, and some minutes elapsed before I attempted to pick a way over this odoriferous spot.

By a coincidence, several seasons later and in the same locality, there occurred another adventure with an even more tragic ending.

Behind a ridge of sand, out of sight of the railroad track, and where a big fallen pine made a permanent back-log for the fire, was a favorite camping site, and here one night we heard a rattling of tin cans behind the tent. One of the guides, lighting a lantern, went back to investigate. We were somewhat surprised to hear him say, "Come here, boys, if you want to see a new variety of canned goods." Leaving the camp-fire, we saw a large tomato can mysteriously coming toward us through the grass, the result of a skunk investigating the interior of an empty can and being unable to withdraw its head, was trying to go home blindfolded. Passing the side of the tent he began climbing up the bank at the end of the back-log, but no sooner did he feel the bark beneath his feet than he turned down the log toward the fire, which was sending its ruddy flames many feet over the top of the log. Shouting to turn him back, and this failing, all retreated as he approached the blaze. Then came a puff of smoke from the singed and sizzling fur, and the poor animal toppled over into the coals below.

Photo by George Shiras, 3rd

THE FIRST SKUNK THAT VISITED OUR CAMP AND TOOK ITS OWN PICTURE (SEE PAGE 788)

See adventures with skunks, pages 790–795

As might be expected, his plight was made known by an odor that quite filled the atmosphere. Protected from inhaling the flames, he managed to reach the tent, when a desire to put an end to such suffering and at the same time save a portion of our outfit led one of us to seize a rifle, with which he was despatched. And then the charred body was interred, can and all.

Except when defending itself against a recognized aggressor or in a final death struggle, a skunk will seldom use his weapon indiscriminately, even though suffering great pain. Of the many dozens trapped about my Michigan cabin, none have signalized their capture by the slightest odor, even though hours or an entire night might pass with a foot in the clutch of a steel trap.

A simple and effective method of safely killing these trapped animals was used at my cabin for many years. A 5-foot chain connected the trap to a long pole, the latter acting as a drag, and when it became necessary to kill and remove the animal from the trap the pole was used to safely drag the skunk down to the little bridge spanning the near-by creek, where, like a giant fishing-rod, the pole, chain, and trap were swung over the water and lowered, the weight of the trap sinking the animal beneath the surface, the carcass being easily removed a few minutes later. Never in dragging the struggling animal to the water did it discharge the fetid matter, evidently because its captor was well out of range through the use of the dragging pole.

Another method of practical value in permanently driving such animals away from one's camp or cabin without running the usual risk when shooting them was brought to my attention while camping south of Lake Superior in 1883. On this occasion a skunk was discovered busily employed eating our small collection of eggs in the provision tent. Shouting or rattling the canvas had but a momentary effect, for every few minutes another egg was pulled out of the box and eaten with great relish. The colored cook was in a frenzy of indignation, favoring drastic action, but the rest of u

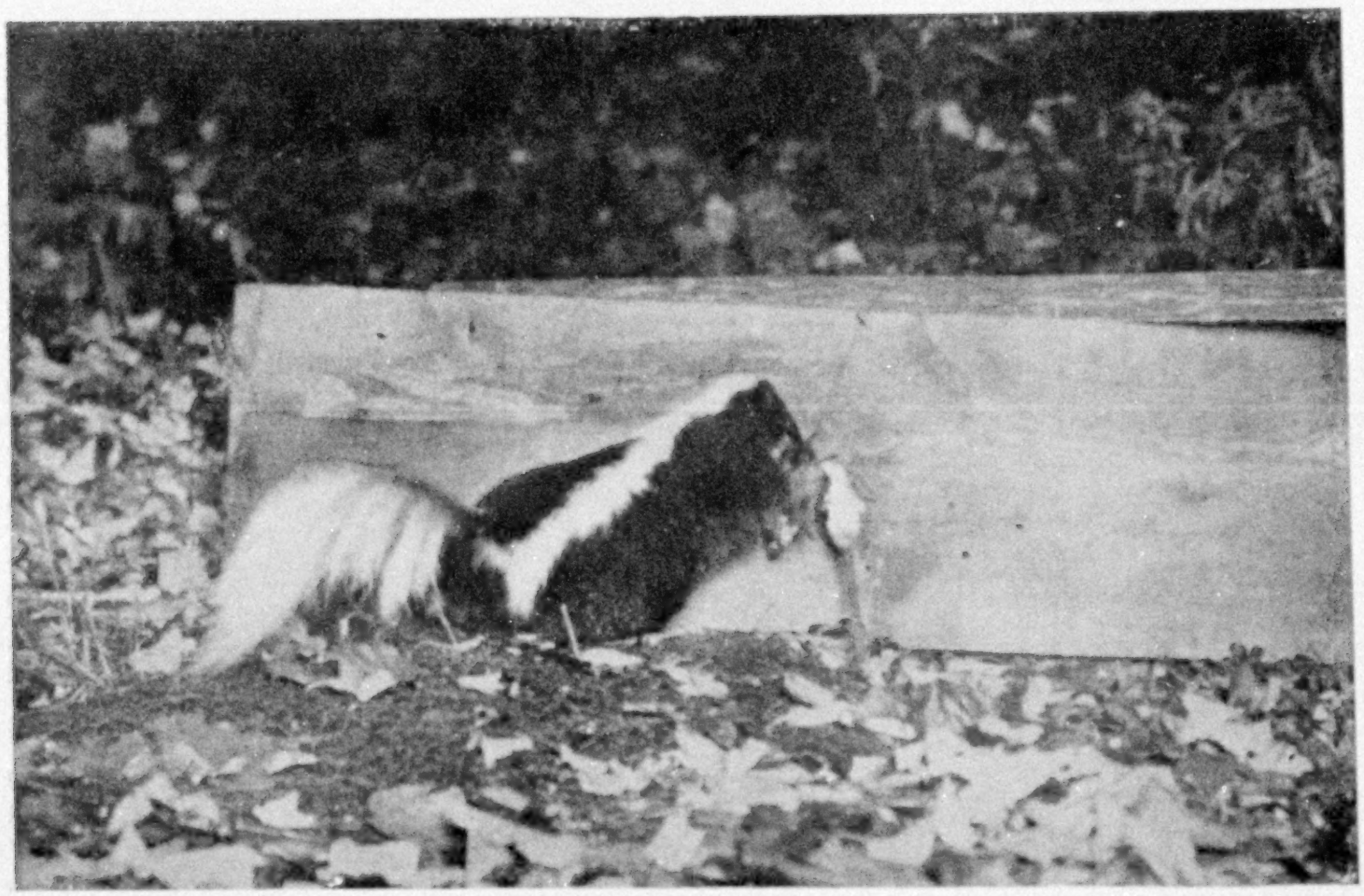

Photo by George Shiras, 3d.

THE WHITE-TAIL SKUNK WHICH VISITED OUR CAMP ON THE SAME NIGHT (SEE PAGE 788)

A series of ten pictures of skunks were taken in a week (see adventures with skunks, pages 790–795)

felt that this might result in the loss of all the other supplies. Just then our Indian guide, Dan, returned from the landing, where he had been cleaning trout, and without a moment's hesitation he went to the camp-fire, scooped out a full dipper of boiling water, and approached the little tent with the evident purpose of scalding the trespasser.

Then a greater consternation seized us, for it seemed highly probable that not only the tent and its contents would be lost, but the animal would soon be in our midst, anxious to retaliate with a fluid worse than that with which he was assailed. Dan, seeing our fear, said: "Don't be scared; he won't even raise his tail when I swat him." This Indian had been a trapper from boyhood, and as he was one of a few of his kind, I had confidence in him regarding animal life; so he was allowed to proceed. The instant the steaming water struck, the skunk abjectly hurried from the tent and disappeared in the brush. The next day the same method was tried on another one feeding behind a log on bacon rind, and, like the other, he immediately left without causing trouble.

The following season the colored cook was employed at a fishing club on Lake Superior, where he was greatly annoyed by a large number of skunks coming about the kitchen after sundown. Recalling the successful dispersal of these creatures the year before, he devoted many evenings to pouring the contents of the camp kettle on them as they assembled below the porch at the garbage can, and in no instance did any of these animals offensively resent the scalding. Later he reported that occasionally bald-headed skunks were seen eyeing the cabin from a distance; but the kettle proved mightier than the garbage can.

That a skunk when suddenly injured, but suspecting an unseen foe, will sometimes fire a broadside in hope of relief may be shown by another incident. Camping one stormy night in an aban-

Photo by George Shiras, 3rd

THE DANGER SIGNAL FOR PERSONS TO KEEP AT A DISTANCE: THE SKUNK SPREADS ITS PLUME-LIKE TAIL IN ANTICIPATION OF THE EXPLODING FLASH

"The second skunk had evidently discovered that every time it pulled on the bait attached to the string there followed a dazzling light and a heavy explosion. Not liking this kind of interruption, it always raised the tail, so the battery concealed beneath would be ready for instant use if the occasion required" (see page 789). "Except when defending itself against a recognized aggressor or in a final death struggle, a skunk will seldom use his weapon indiscriminately, even though suffering great pain" (see page 792).

doned cabin near a trout stream, we were astonished at a fly-rod standing in the corner dropping to the floor, while the reel buzzed vigorously. The owner of this particular rod, desiring to save the fast-disappearing line, placed his foot thereon, and a moment later there arose through the cracks of the shrunken floor a terrific odor of the hooked victim, struggling a few feet below. This occurred in the days when it was not considered unsportsmanlike to add an angleworm to the fly-hook, so when the slack line slipped through the floor the skunk undoubtedly regarded the suspended bait as a small but choice morsel. Cutting the line did not appease the animal, and until midnight most of us remained outside in a pouring rain, awaiting the smoke of battle to clear away.

Still another case of eviction took place where the usual method of resentment had possibly a more subtle meaning. In clearing a lake near the camp of pickerel, in order to replace the same later with black bass, the useful disposal of the captured pickerel became a problem. When it was suggested that one or two fish be put in each potato hill as a fertilizer, the idea seemed a good one. On the night following every hill thus selected had been pulled to pieces

Photo by George Shiras, 3rd

A FLASHLIGHT SET FOR COONS IN A CORN PATCH IS FIRED BY A SKUNK, SHOWING THAT THEY EAT GREEN CORN; SQUASH WAS UNTOUCHED BY EITHER ANIMAL

"Cutting the line did not appease the animal, and until midnight most of us remained outside in a pouring rain, awaiting the smoke of battle to clear away" (see some adventures with skunks, text, page 794).

and the small potatoes scattered about. Skunk tracks told the story of our misdirected effort at conservation. In the evening a trap was placed near by with a fish hanging over it, and in the morning sunlight we found a big, fat skunk, with both feet pinioned by the steel jaws. The usual baptism in the creek followed, and by way of a warning and retribution the body was placed in another potato hill.

The next morning this hill had disappeared, while the body of the skunk was found caught sidewise in a hole beneath the cabin, showing an endeavor on the part of his comrades to carry him from the field of death. In order to get additional evidence on this point, the body was again placed in another potato hill. The camp cook remonstrated, with the remark that at this rate we would be "sure skunked on a potato crop." During the evening a tugging was heard at the edge of the cabin, and later the rubbing backs of the animals indicated that they were pulling the body well under the floor and all uttering a chorus of whining notes. Soon significant glances were exchanged, for from below came the well-known scent, and in a few minutes the several rooms were wholly uninhabitable and we fled to a brush lean-to some yards away. An hour later it was recalled that the four-foot cellar, loosely boarded up to keep the soil from caving in, contained all our meat and perishable food, and that it was in the center of the danger zone. But so thoroughly impregnated had everything become that, lacking food and comfortable shelter, the next day the entire party sadly returned to town.

Whether this proceeding was a wake, followed by a ceremonial salute over the grave, or was a premeditated attack upon

XUM

Photo by George Shiras, 3rd

A PAIR OF SKUNKS PHOTOGRAPHED BY SET FLASHLIGHT AT EDGE OF THE AUTHOR'S DARK ROOM: 1912

Plate developed while the animals were beneath the cabin floor (see page 790)

the occupants above, must be left to the readers for determination.

THE MICHIGAN BEAVER, PAST AND PRESENT

During my earlier visits to the south shore of Lake Superior beaver were abundant, and while seldom seen in daytime the fresh cutting and their slides, lodges, and dams indicated a wide distribution. After 1885 their decrease in numbers became marked, so that between 1890 and 1900 I saw only two, each living a hermit life in a river bank, and neither daring to build a lodge or even provide an adequate supply of bark in the pools close to the under-water tunnels. Such was the situation when the legislature passed a belated act closing the season on beaver for a number of years. Gradually a recovery was noted, and, odd as it may first appear, most of the new homes were close to rural habitations or not far from well-used highways, because in such places the professional trapper had no line of traps or feared to poach, knowing the interest aroused in an animal almost unknown to the later generation of settlers. Today the upper peninsula of Michigan, like many other portions of the northern country, contains more beaver food and a larger area suitable for their habitations than in the days of the primeval forest or before the white man came. Originally every stream, pond, and lake was fringed with a heavy growth of coniferous trees, none of which had edible bark, and it took the beaver countless years to flood out and destroy such forests, when with the appearance of meadows came succulent roots and a variety of mixed hardwoods. On the advent of the lumbermen millions of acres of pine, hemlock, and cedar went down before the axe, which was followed usually by

Photo by George Shiras, 3rd

COONS AGAIN INVADE WHITEFISH LAKE

With the development of agricultural districts the coon is taking up a permanent abode along the south shore of Lake Superior. Last August (1912) the camp corn patch was raided and in three nights most of the small crop was eaten by coons.

fires. The succeeding second growth consisted of poplar, cherry, black ash, birch, and willow, all massed and of small diameter, at the edge of these water-courses. It is in this territory that the beaver now seeks to establish his home and where the commercial value of the trees is least important.

Through the complaint of a few lumbermen, echoed and re-echoed by designing trappers, both the damage and the abundance of the beaver has been greatly exaggerated, resulting in an open season on January 1 of the present year. Fully two-thirds of the area suitable for beaver now contains none. Instead of allowing the trapping out of the beaver concentrated in their new settlements and rendered incautious by reason of the previous closed season, it would have been the better part of wisdom for the State authorities to have caught and transported the surplus numbers to the hundreds of streams and ponds containing none.* Then, with an open season, the risk of a quick extermination would have been greatly lessened.

In October, 1912, I heard of a large beaver dam constructed during the summer about 30 miles northwest of Marquette and within two hours' ride by automobile. The lodge was approaching completion, and as I realized its future occupancy was likely to be of short duration, it seemed proper that the camera should take photographically what the steel trap would take physically in less than 90 days. On the afternoon of Oc-

* One game warden of Dickinson County reports 600 beaver taken in 90 days.

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Photo by George Shiras, 3rd

COON'S FINAL MEAL

Whether the scarcity of the corn, the flashlight, or the sudden appearing of skunks drove the coons away, is uncertain (see page 790)

tober 7 a small tent was set up in a grove of poplars, where many white and tooth-scored trunks showed the recent work of the beaver. The dam had been completed months before, the lodge was about ready for use, and the animals were concerned with their final labor in storing away in the deeper waters near their home an ample supply of poplar and birch.

My plan of operations, decided upon in advance, combined two distinct methods of getting a picture, and neither available on the same night; so it meant camping two days in this little valley. My first scheme was to set up the cameras and the flashlight apparatus opposite the lodge, with the expectation that when a beaver clambered out of the water for the purpose of plastering mud on the side of his house the string placed at the edge of the water would be touched and the flash fired. On page 801 appears the photographic outfit, placed 12 feet in front of the beaver house.

The second plan for the succeeding night consisted in making a small breach in the dam, so when one of the old beav-

Photo by George Shiras, 3rd

NIGHT PICTURE AT THE EDGE OF A SWAMP

When the coons deserted the corn patch, one was photographed at night where he had discovered the piece of bait put out for mink. Note the hand-like paw of the coon

ers discovered by the receding water that repairs were needed at some point in the reservoir walls, the one attempting this work would come in contact with the string and furnish the second picture I was after.

The first night my guide and I were in the sleeping bags at dusk, for a heavy frost was threatening and no blazing fire could be permitted in this locality. An hour later came the flap of a beaver's tail down by the lodge and repeated frequently thereafter, indicating that a trace of scent or the dark-green camera boxes were exciting alarm. No welcome explosion was heard during the night, and in the morning I found that the animals had spent the time towing in an additional supply of bark. Whether the house was entirely completed or work thereon had been suspended for awhile I could not tell.

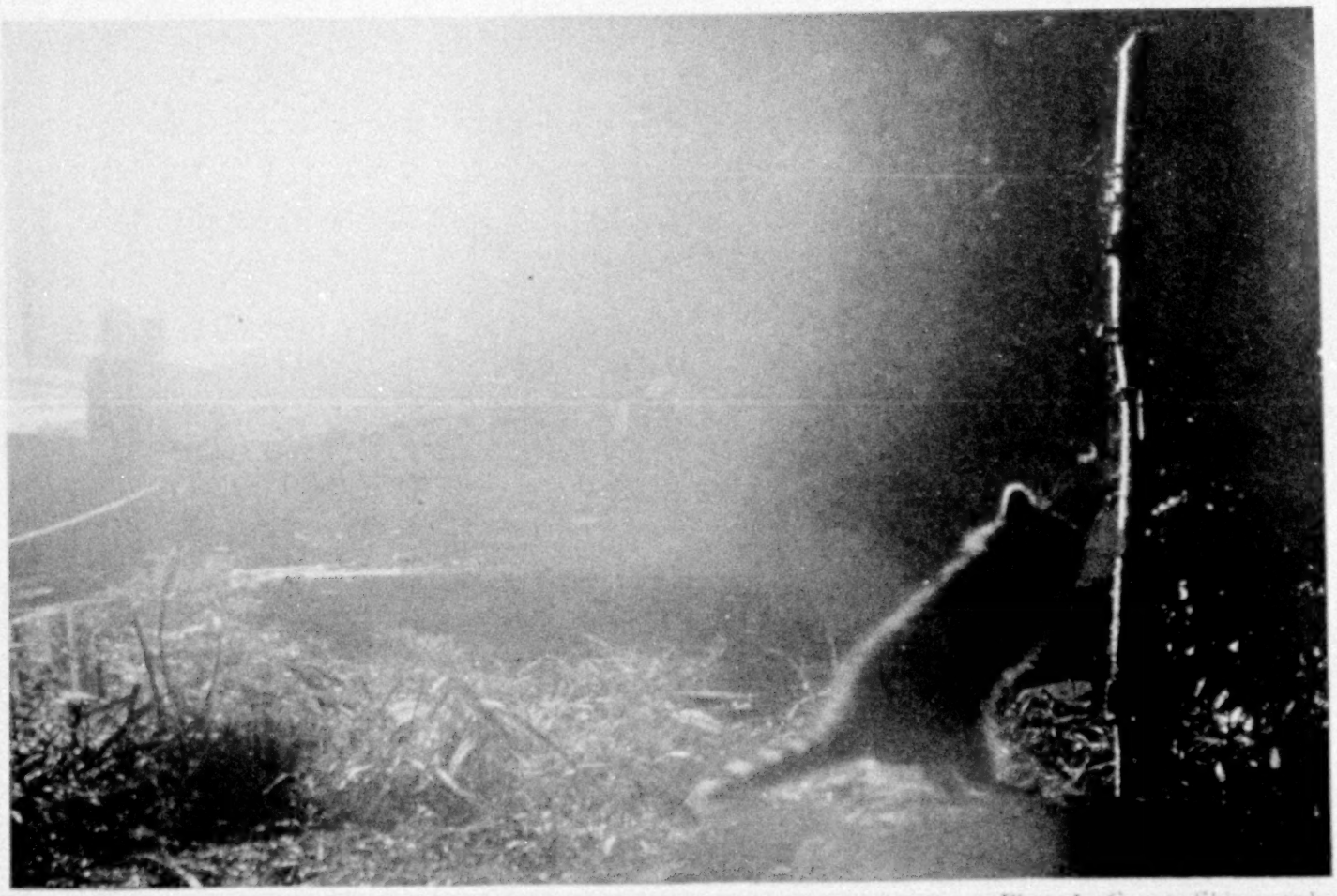

Photo by George Shiras, 3rd

PHOTOGRAPH OF A FLASHLIGHT SCENE

In order to show what a flashlight scene looks like, the author placed a camera, facing the flashlight, with the object to be photographed between the camera and the flashlight. The great, white ball of light to the left is the exploding powder, while the coon, silhouetted against the light, is seen pulling on the string.

During the day not a beaver was seen, but late in the afternoon a pair of muskrats was busily engaged at work near the edge of the overflowed meadow erecting their smaller home, thus showing a keen appreciation of the slack water afforded by the dam built by their larger kin. Before dark the water had fallen six inches below the rim of the dam, and this, I felt sure, would be sufficient notice to the watchful beaver.

Across the break in the dam I placed a birch branch, tying the flashlight string to it, with the idea that the beaver, after an inspection of the damaged part, would pull the branch aside on beginning the repairs, and thus fire the flash.

It was not until after midnight that I saw a faint flutter of light on the white canvas roof, followed almost immediately by the boom of the flashlight. In the morning it was found that a beaver had cut the birch branch in two, and while pushing one piece aside the flash was discharged. This discouraged further efforts, and the beaver retired to his wigwam to report an extraordinary condition of affairs both at the dam and on shore.

But not all such pictures are successful, for there are several complications in night photography which may rob one of his pictured game. With great care the negative was developed, and there, in the center of the plate, appeared the sturdy figure of the beaver, its coat glistening in the brilliant artificial light, while the clear waters of the meadow stream permitted the lens to show the flattened tail beneath the surface of this woodland pool (see page 803).

BIRDS WILL TAKE THEIR OWN PICTURES

Most birds are photographed about their nests, or in the great rookeries and breeding resorts of the sea-coast and inland waters, when the domestic duties of the parents or when the fearlessness

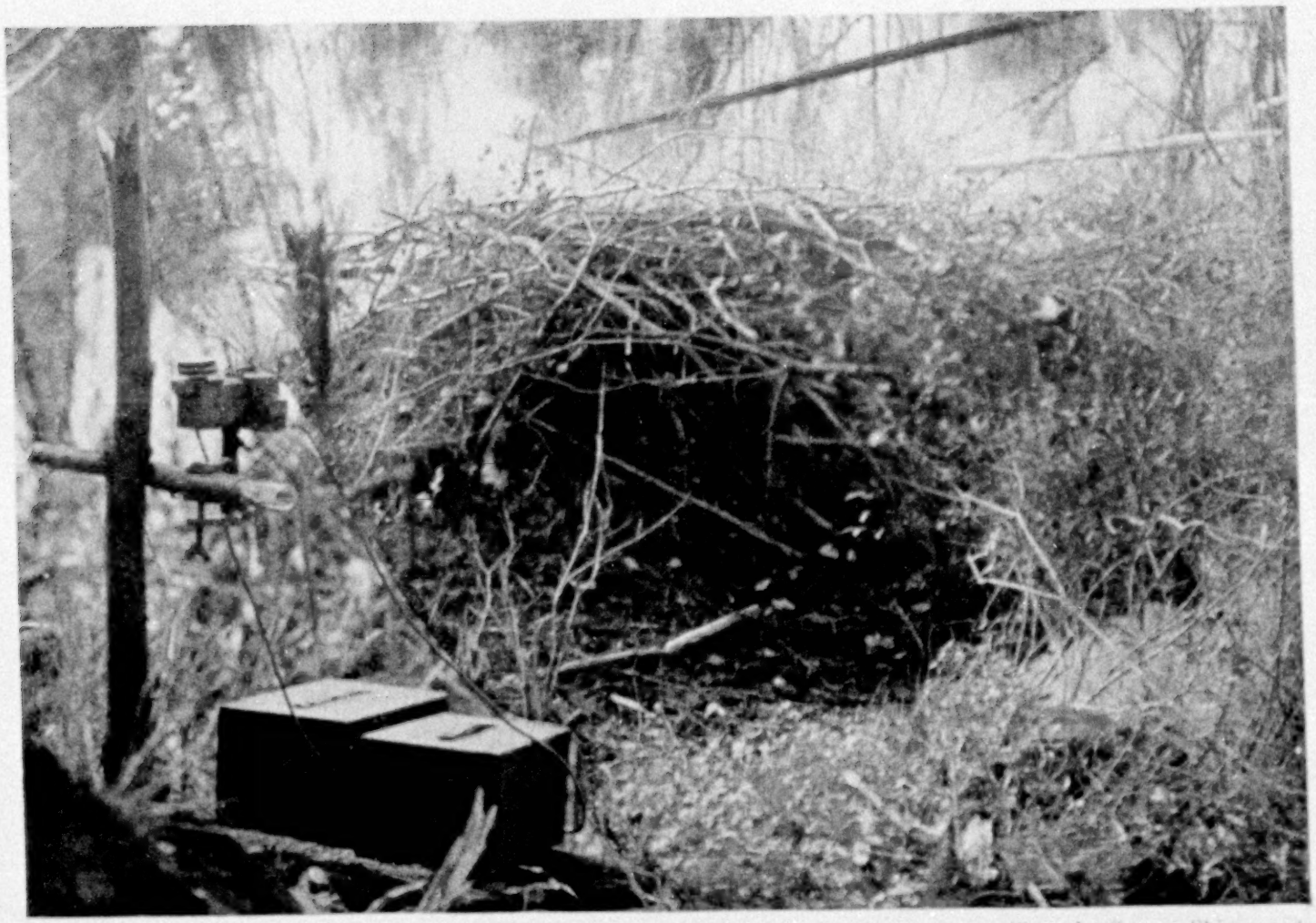

Photo by George Shiras, 3d

A MICHIGAN BEAVER HOUSE

This house was a great dome, 9 feet in diameter and 5 feet high, composed of twigs and branches, the interstices filled with mud or clay and the center hollowed out into a commodious bed-room having two under-water exits to the pond. The two cameras and flashlight apparatus were placed at the edge of the bank and the pulling string ran to a portion of the house where apparently it was unfinished (see page 798).

manifested by many birds under colonization makes such photography pleasant and generally successful.

But there are times of the year and localities, as well as different birds, where an approach is difficult. Often a good method of getting birds singly or in flocks is the set camera.

Some years ago I tried to get a group picture of comparatively tame buzzards and vultures which daily circled about my southern cottage; but even when I was in a well-concealed retreat these keen-eyed birds knew of my presence and would not alight in the vicinity of the bait. After an hour's wait I set out a smaller camera, covered with palmetto leaves, within 10 feet of the meat, and tying a piece of this to a string, I withdrew. Returning in half an hour, the bait was all gone and the pulling string in a hopeless tangle. The group obtained included both the black vulture and the turkey-buzzard (see page 804).

Almost any bird of prey, like the hawk, owl, eagle, or condor, will pull energetically on the string; but in the case of smaller or more timid birds it is advisable to use an auxiliary spring trigger, or even a common mouse-trap will do, since the release of the wire collar to which the string may be attached only requires the slightest pressure.

Pictures of birds nesting on sea beaches, in open marshes, or the tundra, where the use of a blind is difficult, may be obtained by concealing the camera in rocks, sea-weed, or marsh vegetation. By stretching a thread taut across the nest, the brooding bird on re-entering will release the shutter. It is usually best to make the screen for the camera a day in advance, so as not to imperil the fertility of the eggs or the life of very young

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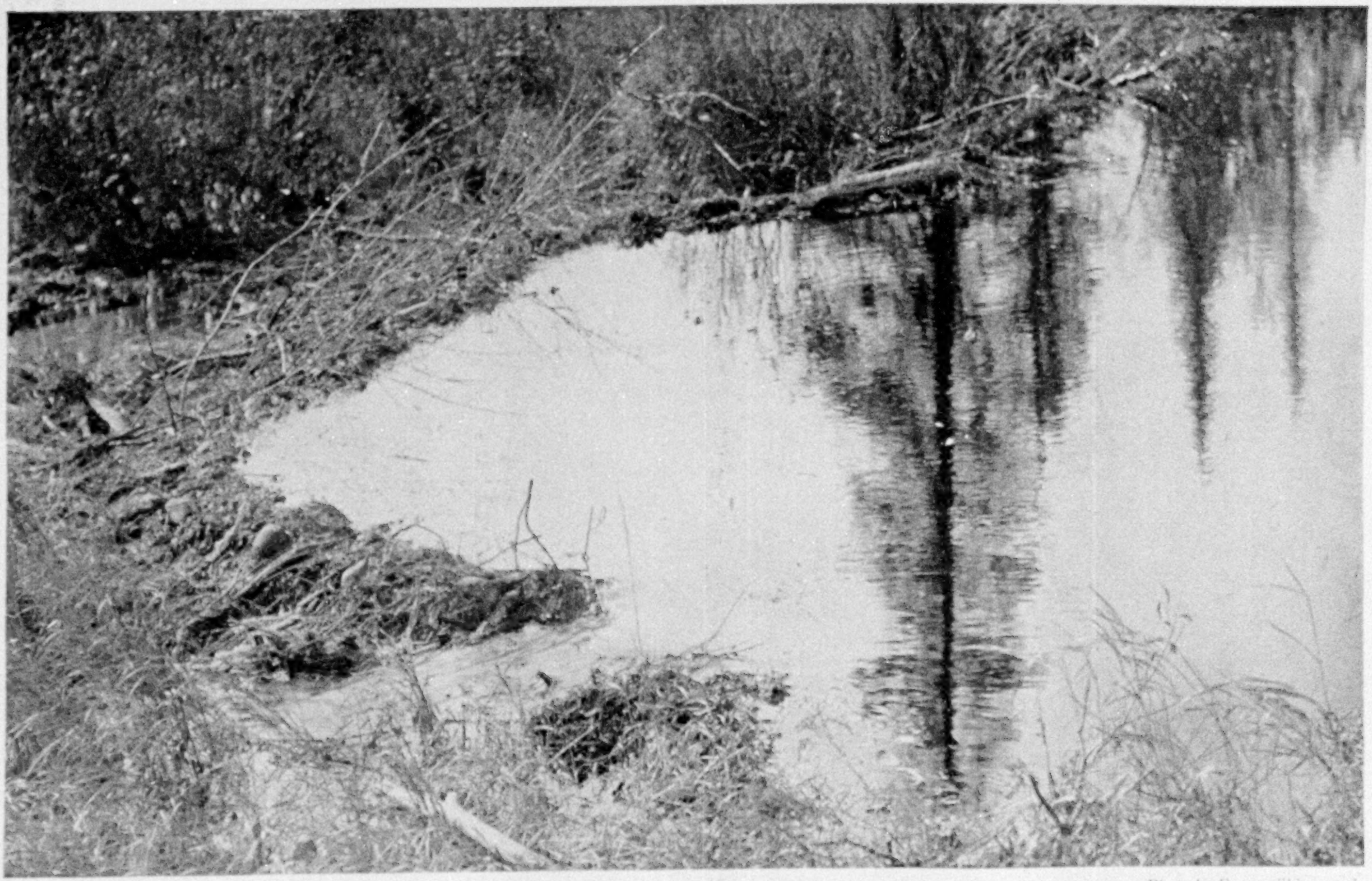

Photo by George Shiras, 3rd

A BEAVER DAM (SEE PAGES 797-800)

This particular structure was 300 feet long, extending in broken curves across the valley and with a wall 5 feet high and 4 feet thick at the base. It was composed of brush and mud, with an unusually large number of heavy stones along the rim. During July, 1912, 35 feet of the dam were blown up by dynamite in order to harvest a hay crop in the meadow above. In less than five days the beavers had completely rebuilt the dam. In October, 1912, the author made the small break in the dam near the left bank, shown in this picture, so that when the beaver was warned by the receding water it would investigate the cause and set off the flash. In daylight the pictures of water are white with dark shadows and reflections, while in the night picture following, the water is black and the reflections white.

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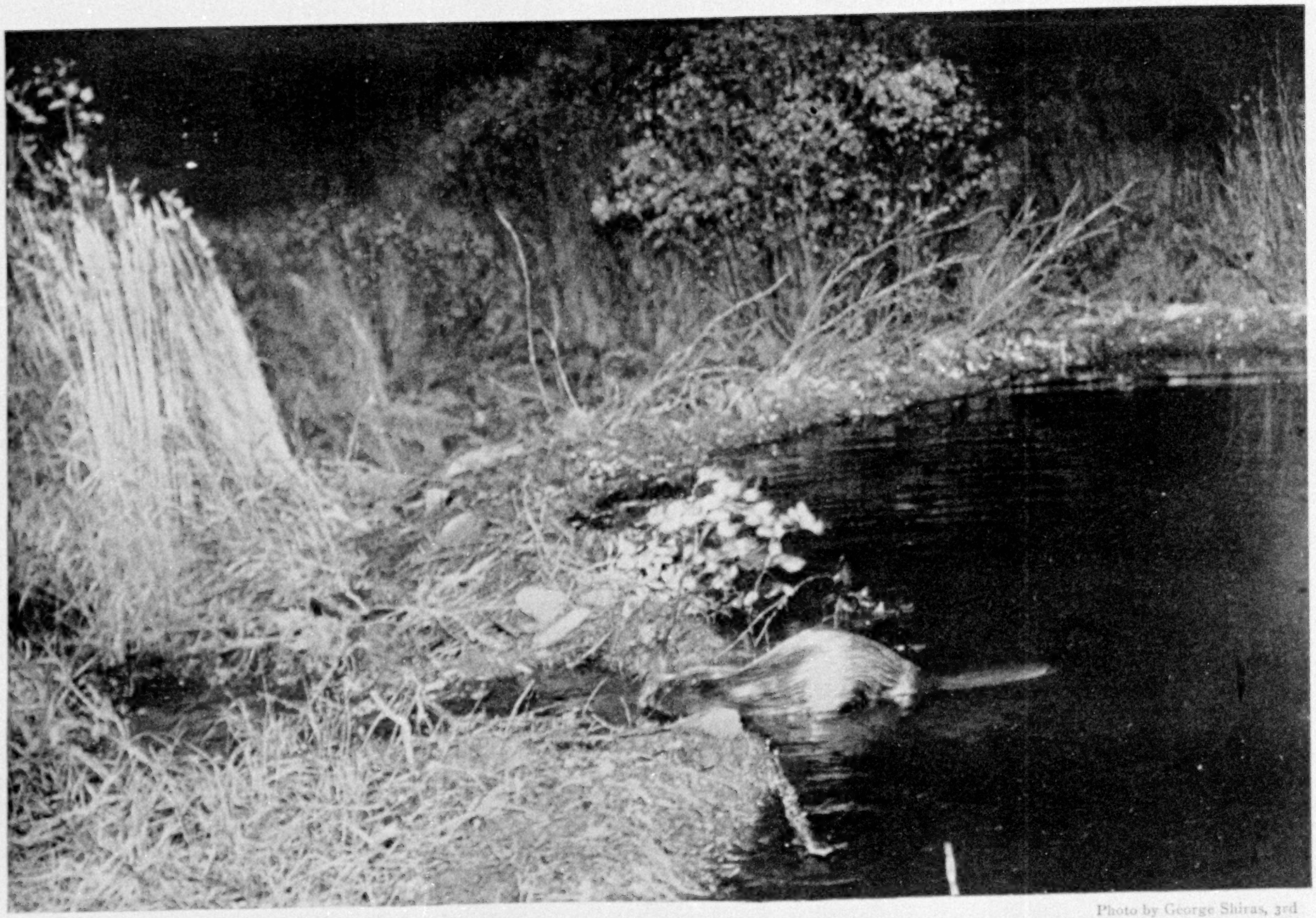

Photo by George Shiras, 3rd

THE BEAVER TAKES ITS OWN PICTURE AT NIGHT

About midnight a beaver came to learn the cause of the fall in the water. When he pulled aside the branch to which the flashlight string was attached and which had been placed in the break for that purpose, the flash was exploded and the record made (see page 800)

Photo by George Shiras, 3rd

BIRDS CAN ALSO TAKE THEIR OWN PICTURES (SEE PAGE 801)

After trying vainly for more than an hour to photograph comparatively tame buzzards and vultures, the author abandoned the blind behind which he had been concealed and set out the automatic camera with string and bait. On returning in about half an hour, he found the bait gone, and the development of the plate some hours later revealed the above picture of a black Florida vulture and tame buzzards.

birds, for strong sunlight or chilling wind are equally fatal. In this way I secured a series of snipe pictures on the eastern shore of Virginia otherwise unobtainable.

Having for several seasons scattered grain about an orange grove to attract local birds more regularly, I took a few of their pictures with the automatic camera, the focal plane shutter being set at 1/400 of a second. For the quail and ground doves (see page 806) I used grains of wheat and sunflower seed strung on a thread.

Finally several gray squirrels discovered this feeding place; so corn and nuts were substituted, the loose end of the string being just long enough to permit the squirrel to rise on its quarters—the most graceful and characteristic pose of this animal (see page 810).

PHOTOGRAPHING WILD ANIMALS OF THE RURAL DISTRICTS

I think very few persons suspect the abundance of night-loving animals in the vicinity of country homes, where there is a dense thicket, a swamp, or a rocky ravine. There may be found a burrow, a cleft in the rocks, or a hollow tree affording safe refuge to many an animal that seldom makes its presence known to the throng that daily passes.

Here, hidden away until the midnight hour, is the raccoon, opossum, skunk, weasel, or the rabbit.

Just by way of proof for any one that doubted this, I have set out every winter for several years past a camera and flashlight in the town of Ormond Beach, Florida, within 100 yards of a dozen cottages and a great winter hotel harboring a thousand guests and employés. Nearly every night came the burst of brilliant light betwixt an orange grove and a thicket, with an explosion audible to all awake, and each morning thereafter it became the custom to hear the oft-repeated inquiry, "Well, what did you get last night"?

During 33 nights in 1913 the nega-

Photo by George Shiras, 3rd

TWO GROUND DOVES AT THE BAIT, WHILE A MALE CARDINAL LOOKS ON

tives showed 12 skunks, nine of which were of different markings; four coons, three opossums, one cat, one pointer dog, two rabbits, and four wood-rats; yet neither the visitors, natives, nor caretakers in this vicinity ever encountered any of these animals, and only the roar of the flashlight and the ever-increasing pictures carried conviction. Some of these animals are shown on pages 807, 808, 809, 811, 812, and 813. The year before the result was the same, except for a greater preponderance of coons and a picture of a land turtle.

While this article deals primarily with mammals, it may be noted that alligators, crocodiles, snakes, and turtles may be taken in the daytime and sometimes at night with the set camera. A string, baited or unbaited, across the basking spot of such reptiles will insure a daylight picture, when the sun is high and the shutter set at its fastest speed; while at night, when the alligators and crocodiles roam the murky waters, a piece of bloody meat or fresh fish will attract them on to the bank or sand-bar.

There is a very abundant land turtle of the South, known locally as the "gopher," which lives in a burrow and seldom appears during the day. Last year I found one of their holes within a few feet of the spot where bait had been placed for coons. This turtle, even in the extreme South, often hibernates during the so-called winter months, when fresh vegetation is at a low ebb. It was not until the middle of March that fresh tracks in the soft sand at the entrance of the burrow showed the occupant was once more abroad. A thread across the entrance blocked its egress and on the following night the explosion was heard. The picture on page 814 shows the clumsy animal trying to push its way out, but the flash sent it deep down into its hole for another week, when a second picture was taken, and again it retreated for so long a time that the camera was removed.

Flashlight portraiture evidently does not meet with the approval of some turtles.

UNBIDDEN GUESTS

Just as the fisherman complains of the shark taking the hook intended for an edible fish, or the trapper of a wolverine pilfering his bait, so the camera-hunter often finds the string broken or the bait taken by some unwelcome visitor.

Cameras placed where cattle, sheep, and hogs range will be sprung by these wandering animals. One night a notoriously ill-natured bull, belonging to a Finnish settler, swished his tail unconcernedly against the flashlight cartridge and got a dose of flame and fumes that made his bellows audible several miles. On a trip up the Tamesi River, in eastern Mexico, I tried for a week to get pictures of ocelot and the jaguar, but

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Photo by George Shiras, 3rd

FLORIDA QUAIL TAKE THEIR OWN PICTURES (SEE PAGE 804)

Unexpectedly a flock of seven quail discovered the seeds put out for smaller birds. Six pictures were taken by the author pulling the string and two the quail took during his absence. In the above group are four cocks and two females

Photo by George Shiras, 3rd

A TOM-CAT ON A HUNT FIRES FLASH SET FOR RABBITS, IN FLORIDA

No animals more destructive to birds and small game exist than stray cats, for they possess all the cunning of their wild ancestors and much more, acquired through domestication

early every night the flashlight was fired by several varieties of opossum, and it mattered not how high the bait was hung or its variation in kind.

While on St. Vincent Island, off the gulf coast of Florida, instead of coons I only got razor-back hogs, and on the main shore, on a rabbit runway, the flash was fired by a big tomcat seeking a bunny for his supper. During two trips after wild cats in a southern swamp hogs took the bait in the daytime and skunks the bait at night. Stray hounds hunting for pleasure and sledge dogs of the North, supporting themselves in summer, will eagerly follow up wind to the spot where the scented bait is in front of the camera, but, fortunately, these canines seldom return again after one bombardment of the flash.

But domestic animals are not the only source of trouble. In the wildest portion of Newfoundland a camera set in daytime, with a string across a trail used by caribou migrating in the fall, was walked into by a French trapper, who, on feeling the pressure of the string on his leg and hearing the click of the shutter, jumped back with a yell, thinking his life had only been saved because a set gun, the most diabolical device of the pot-hunter, had missed fire.

Again, a camera and flash set for deer and peccaries, on a supposedly disused trail at the edge of a Mexican sugar plantation, might have resulted in an international complication, because two Mexican girls, who walked into the string when groping their way to a canoe landing, thought they had been fired at from ambush by our party, camping near by, and fled shrieking through a jungle of palmetto and thorns to the nearest cabin, where the additional cries of the children and barking of the dogs made such an uproar that I was quite concerned.

My two estimable companions, Messrs.

Photo by George Shiras, 3rd

A FLORIDA RACCOON TAKING HIS OWN PICTURE

These animals feared neither the flashlight nor slumbering people when seeking a meal within an orange grove at Ormond Beach (see page 805)

Chapman and Fuertes, declared I ought now to appreciate their feelings every time they happened to approach camp at dusk, "with such infernal machines secreted anywhere and everywhere."

A few minutes later our host, an American planter, hearing the uproar, came along and, discovering the cause, shook me warmly by the hand, expressing a wish that I set out a lot more flashlight machines to scare off Indian and Mexican trespassers; so I became reconciled in thus having unexpectedly performed a service in his behalf.

Some of these unbidden guests are shown on pages 816 and 817.

MOUNTAIN MOOSE OF THE UPPER YELLOWSTONE

While endeavoring to visit and study the moose of the American continent throughout its several distinct ranges, I was informed that a small number of these animals were living near the very summit of the Rocky Mountains, and that one locality, where they had been seen in 1906, was about Bridger Lake, a few miles south of the southeast corner of Yellowstone Park, in the State of Wyoming. At this time I had only been able to locate one mounted head from the intermontane States and institutions, such as the National Museum, had neither skins, antlers, skeletons, or any data whatever bearing upon the number probably surviving in the Rocky Mountains south of Canada.

An examination of the map indicated several possible routes to the district in question: one by the way of eastern Wyoming and Thoroughfare Creek; another from Jacksons Hole through Two-ocean Pass; and a third by way of the National Park, and thence up the Upper Yellowstone River by pack-train or possibly by canoe (see map, page 818). Selecting the latter route as the most feasible for the heavy outfit necessary for

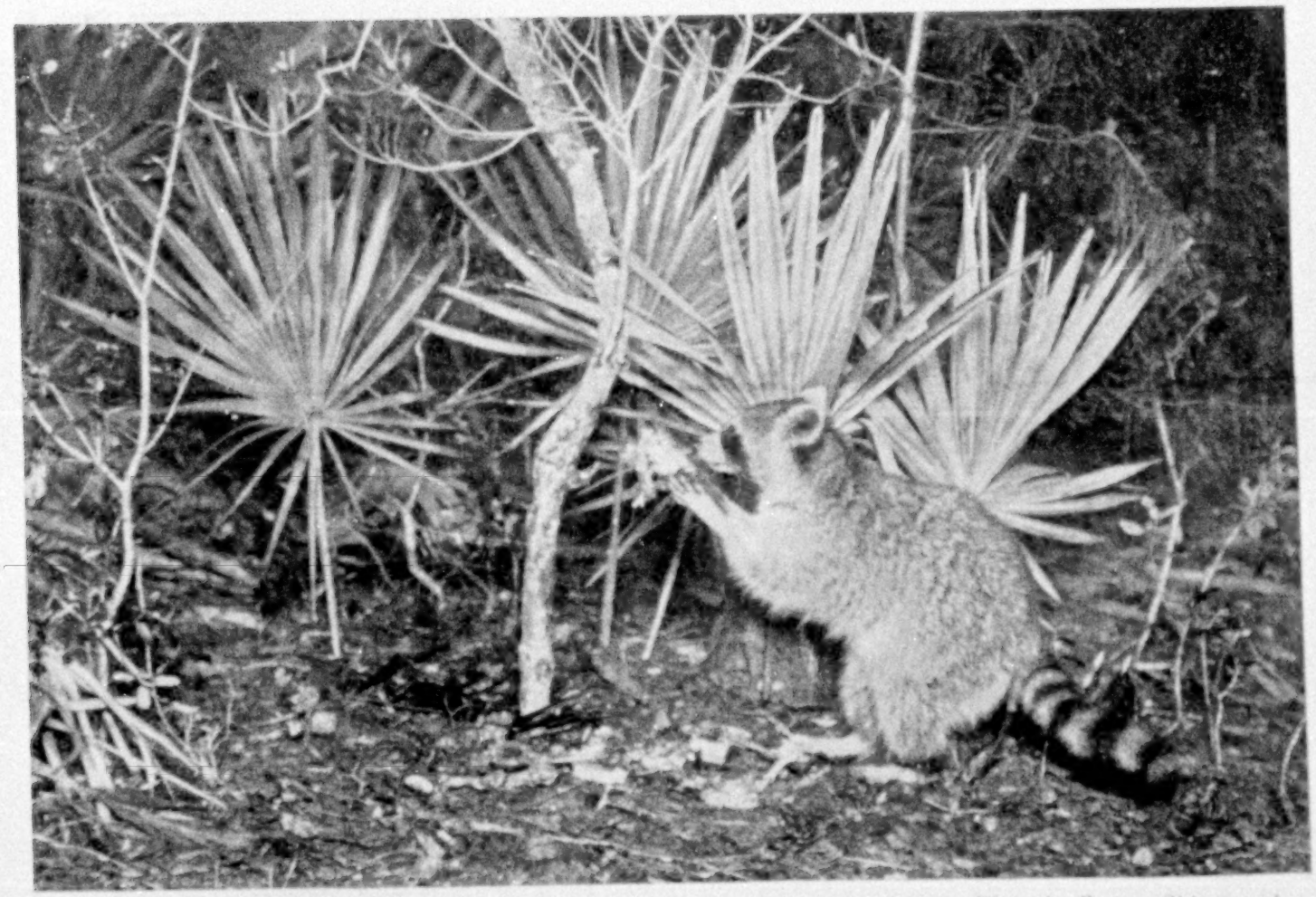

Photo by George Shiras, 3rd

VERY FEW PERSONS SUSPECT THE ABUNDANCE OF NIGHT-LOVING ANIMALS IN THE VICINITY OF COUNTRY HOMES

"I have set out every winter for several years past a camera and flashlight in the town of Ormond Beach, Florida, within 100 yards of a dozen cottages and a great winter hotel harboring a thousand people. During 33 nights the negatives showed 12 skunks, nine of which were of different markings; four coons, three opossums, one cat, one pointer dog, two rabbits, and four wood-rats; yet neither the visitors, natives, nor caretakers in this vicinity ever encountered any of these animals, and only the roar of the flashlight and the ever-increasing pictures carried conviction" (see text, pages 804 and 805).

my purposes, I entered the north end of the park in July, 1908, accompanied by my Michigan guide and another, then a resident of Montana. Wishing to avoid dependence upon a pack-train in the mountains and believing from inquiry that the Upper Yellowstone was navigable for a light boat in early summer, I brought along a large collapsible canvas canoe, capable of carrying three persons and more than a thousand-pound outfit.

Traversing the entire length of Yellowstone Lake in a gasoline launch, we entered the long southeast arm on the afternoon of July 23. Well within the entrance, a couple of low rocky islands shone white with breeding pelicans, gulls, and terns (see page 820). Heretofore no one seemed to know whether the white pelican bred on the lake or not, for, strange as it may seem, our launch was the first to enter the southern corner of the lake in more than ten years.

THE ALMOST UNKNOWN UPPER YELLOWSTONE VALLEY

During this and subsequent investigations the writer became and continues strong in the belief that the lower part of the lake and the valley of the Upper Yellowstone constitute one of the wildest and least frequented districts in the United States, especially when taking into consideration its accessibility, its wonderful beauty, and the entire absence of hunters, trappers, tourists, or camping parties of any kind. Yellowstone Lake is perhaps the largest body of fresh water at that altitude (7,741 feet) in the world; and while its northwestern

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Photo by George Shiras, 3rd

A FLORIDA GRAY SQUIRREL PULLS ON THE NUT BAIT AT END OF STRING AND TAKES HIS OWN PICTURE IN THE DAYTIME

"Finally several gray squirrels discovered this feeding place; so corn and nuts were substituted, the loose end of the string being just long enough to permit the squirrel to rise on its quarters—the most graceful and characteristic pose of this animal" (see text, page 804).

shore is traversed each summer by more tourists than probably any other mountain lake, it has the much greater distinction of being less frequented at the lower end than any similarly attractive body of water. Such a condition is due to the park having been set aside in 1872, and with no big-game hunters coming over the mountains to the southern boundary, because the same game can be found lower down and because the State of Wyoming has lately turned the adjoining National forests into a perpetual refuge, and with no hunters passing either way through the valley, this area has lapsed into a perfectly untrodden wilderness.

An occasional government scout follows a blazed pony trail on the eastern foothills of the valley, but they remain mostly out of sight of the timbered bottom lands teeming with unseen and uncounted game.

As there are none of the more spectacular manifestations of nature so abundant elsewhere in the park, the inducement is lacking for diverting into this distant corner the great flood of tourists which annually sweeps in a circular journey in and out of the park.

Camping the first night in a little bay on a small promontory facing the broad delta of the Yellowstone, the canvas boat was set up and further strengthened by hardwood strips cut for the purpose. As the sun descended and the winds fell, hundreds of cow elk and calves sauntered down from the lower hills to feed on the swamp grass of the valley; but not an adult bull was seen then or during the entire trip, as they prefer to remain secluded in the highest timber during the midsummer period of horn growth.

In the morning a little time was lost trying to find the real mouth of the Yel-

Photo by George Shiras, 3rd

A FLORIDA OPOSSUM GRABS THE BAIT AND PHOTOGRAPHS HIMSELF (SEE PAGE 805)

This animal is the only American marsupial and, being very prolific, is abundant throughout its range, though seldom seen in the daytime

lowstone, since there were several side channels, deep bayous, and a couple of other streams entering the bay.

While thus paddling about we saw thousands of geese and ducks, mostly females with their broods, and all as wild and unapproachable as those in a less secure retreat; for migratory wild-fowl, shot at eight or nine months each year, do not lose their dread of man in the short nesting period, unless brought into continuous contact with those who cannot kill, as is the case in the many ponds alongside the park highways, where the birds sit preening themselves as the heavily laden coaches rattle by. With game animals the same is true, for those about the tourist hotels are frequently tamer than domestic stock, just as those in the more secluded parts of the park are the wildest of the wild.

On entering the river, the current, after a few miles, became much stronger than expected; and as, at best, a cumbersome

Photo by George Shiras, 3rd

AN ALMOST BLACK SKUNK WHO TOOK HIS OWN PICTURE AT THE SAME PLACE WHERE THE COONS (PAGES 808 AND 809), THE OPOSSUM (PAGE 811), AND THE CAT (PAGE 807) WERE ALSO PHOTOGRAPHED

canvas canoe is a poor craft for ascending swift streams, I soon saw that a mistake had been made in not bringing with us a long tracking line. However, with two paddles and a pair of oars, some progress could be made, our short line being sufficient for working around the more dangerous log-jams.

CHARGED BY A SILVER-TIP GRIZZLY

And now occurred an affair that shall be briefly described, there following a somewhat similar adventure later on more appropriate for this article.

While taking advantage, when stranded on a sand-bar, to look at a favorite crossing place for elk, I suddenly saw a large animal leap out of the bushes at the head of the bar and come down the river. It proved to be an immense silver-tip grizzly, and as he was fully 100 yards away none of us thought other than that he was badly frightened, probably by our scent circling in behind him. This belief was but momentary, for with head up and looking our way it was plain he intended visiting the stranded boat.

Beyond my exclamation, "Look ahead!" we were silent and motionless. When the bear was 40 yards away, I managed to get hold of a small revolver in a bag at my feet, and in desperation fired two shots over his head; but on he came, probably not hearing the slight crack of the smokeless powder. Aiming the third shot at his exposed chest when only a dozen yards away, a swirl of the heavy hair on the right showed the misdirected bullet had creased his side, and at the same instant the Montana guide, Farrell, gave one of his mountain war whoops and brandished an oar as threateningly as possible. The bear stopped, swung his big head from side to side, with his small eyes fixed for the first time intently on the boat, and then with a quick whirl, which sent the loose gravel in every direction, he put for the bank and

Photo by George Shiras, 3rd

FOURTEEN SKUNK PICTURES WERE OBTAINED BY THE SET CAMERA AND FLASHLIGHT IN TEN DAYS IN THE ORANGE GROVE AT ORMOND BEACH, FLORIDA

They showed nine differently marked skunks, ranging from an almost solid black (see page 812) to the almost white animal shown in this picture (see text, pages 804, 805)

into the heavy bushes at a gait that did our hearts good. While relieved by the sudden change in the situation, no time was lost shoving out into the deeper water and soon we were on the way again.

Undoubtedly there are many, in good faith or under the temptation of magnifying the perils of the wilderness, who would attribute a deliberate attempt on the part of this bear to kill us, from which he was only deterred by the apparently courageous reception. This, in the writer's judgment, was not the case at all. Both sides were equally frightened and both laboring under a misapprehension. This animal, with an unusual opportunity for catching calf elk when swimming the swift waters at the crossing, from his ambush on the bank heard a commotion down the river, and, with the notoriously poor eyesight of all bears, thought he saw in our brown, canvas-covered forms and the splashing paddles the game he sought, which was enough in a territory where man was unknown to bring him down at his best speed, the only thing that really counted in such a raid. Had he meant to harm us the sting of a pistol bullet and the accompanying demonstration would have had no effect beyond aggravation. That he had run into an unexpected gathering, and that it was purely "a case of mistaken identity," his hasty retreat sufficiently proves, were it not already known that the day has gone when any bear in any part of the United States will wantonly attack a man when unmolested.

At the next bend, however, as a matter of precaution, the axes were taken out from under the outfit, and also a heavy pole cut for "a crack on the nose," which, according to Farrell, an old-time bear hunter, was worth a dozen random rifle shots.

FIRST SIGNS OF MOOSE

With an increasing current and bad log-jams the speed of the boat became

Photo by George Shiras, 3rd

THE SLUGGISH LAND TURTLE, OR SOUTHERN "GOPHER," ALSO PHOTOGRAPHS ITSELF

After months of hibernation, this clumsy animal in coming out of its burrow fires the flashlight and then retreats for another week (see page 805)

After months of hibernation, this clumsy animal in coming out of its burrow lifts the flashlight and

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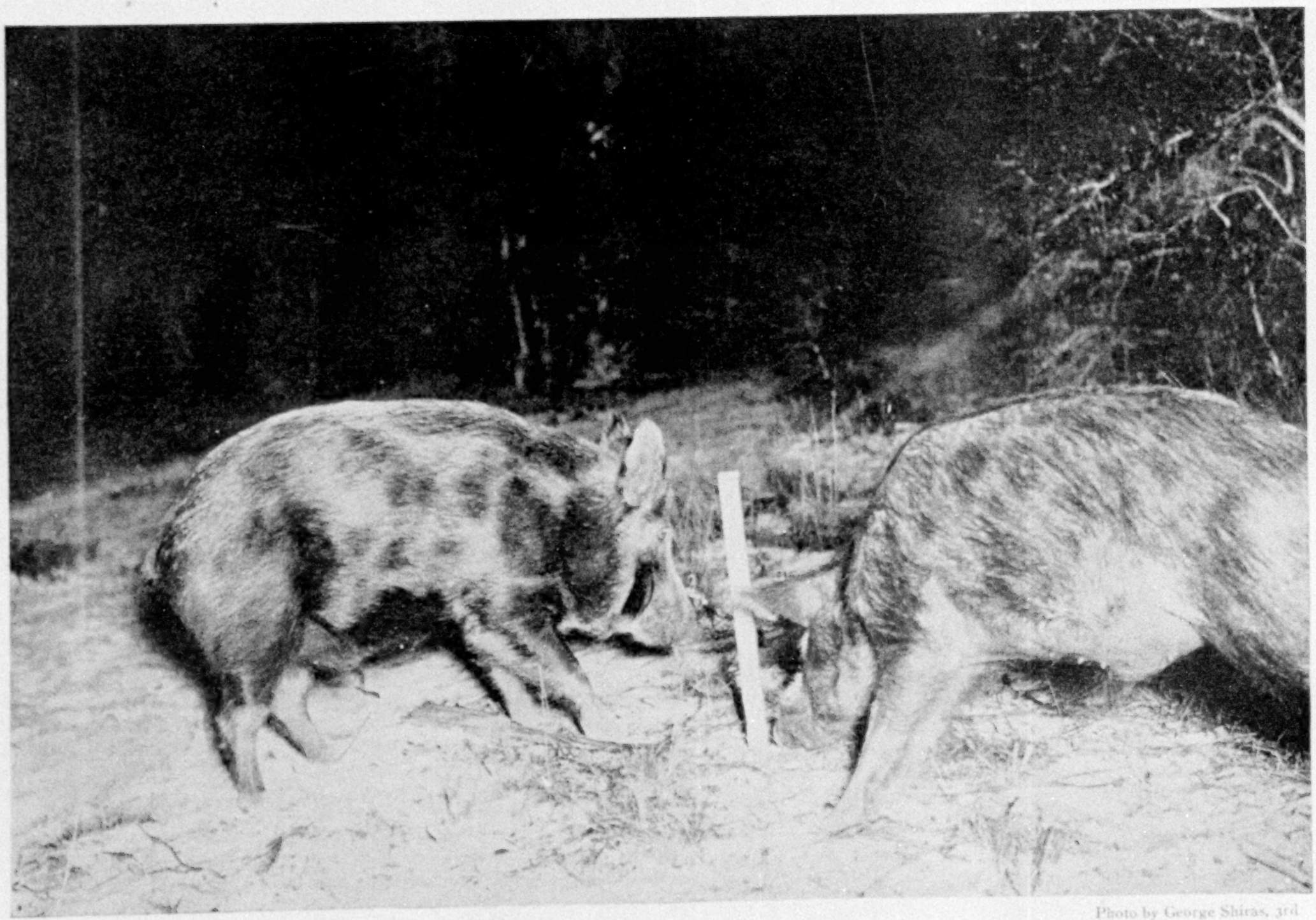

Photo by George Shiras, 3rd

UNBIDDEN GUESTS: RAZOR-BACK HOGS FIRE THE FLASH

"Just as the fisherman complains of the shark taking the hook intended for an edible fish, or the trapper of a wolverine pilfering his bait, so the camera-hunter often finds the string broken or the bait taken by some unwelcome visitor" (see text, page 805). In this case the camera was set out at night for coons on St. Vincent Island, off the Gulf coast of Florida.

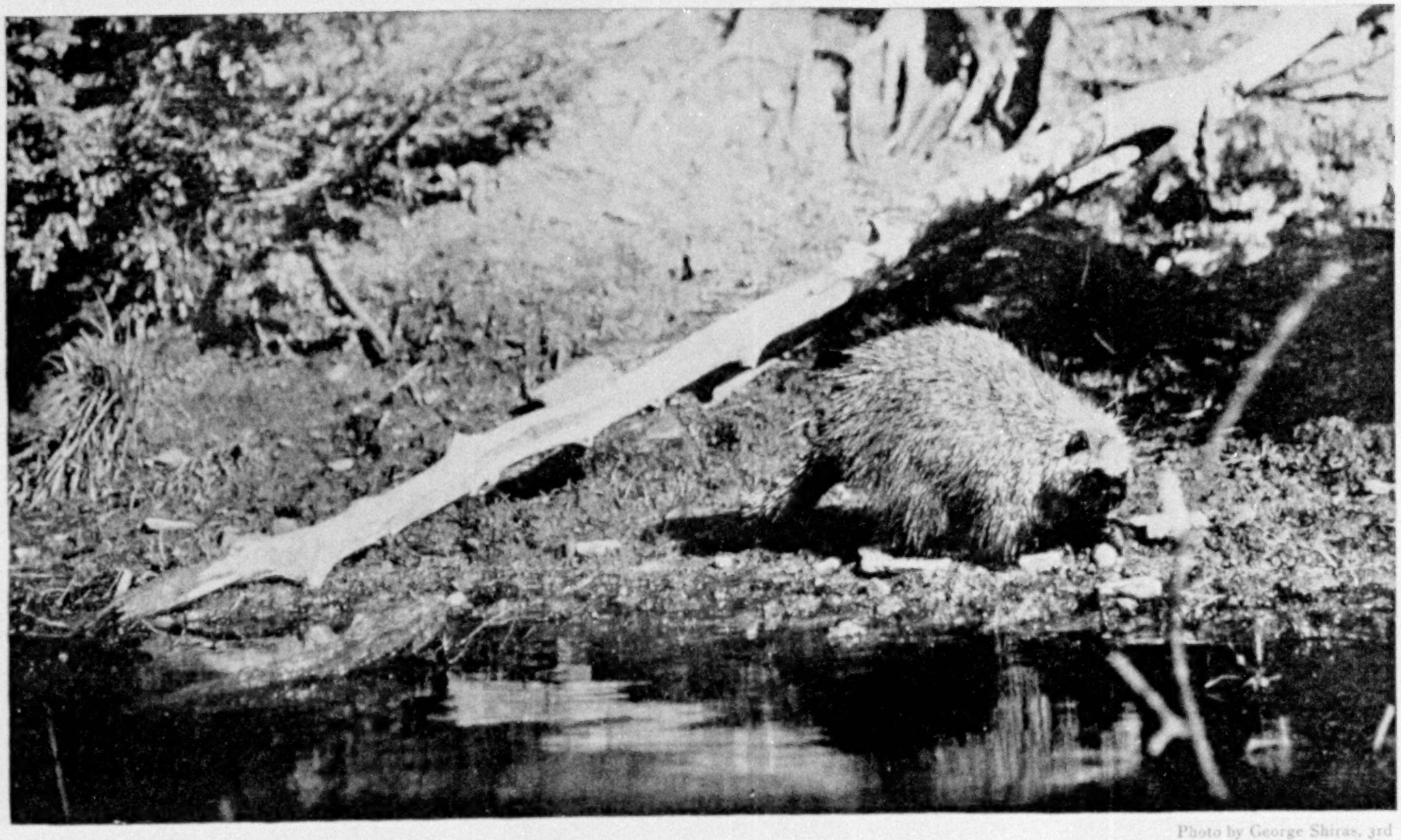

Photo by George Shiras, 3rd

ANOTHER UNBIDDEN GUEST; A CAMERA SET FOR DEER IN DAYTIME WAS SPRUNG BY A WANDERING PORCUPINE (SEE PAGE 805)

The author was unable to get ocelot and jaguar pictures because the opossum was abroad at dusk and took the bait before the more cautious animals appeared. In this picture the flashlight is reflected back in the opossum's left eye.

Photo by George Shiras, 3rd

ANOTHER UNBIDDEN GUEST: A MEXICAN OPOSSUM FIRES THE FLASH

Photo by George Shiras, 3rd

COW CARIBOU AND CALF: NEWFOUNDLAND

The camera was set with a string crossing the trail used by Newfoundland caribou in their fall migration. Several pictures were taken at this spot, the best of which appears above. It was here the French trapper sprung the camera and thought it was a set-gun.

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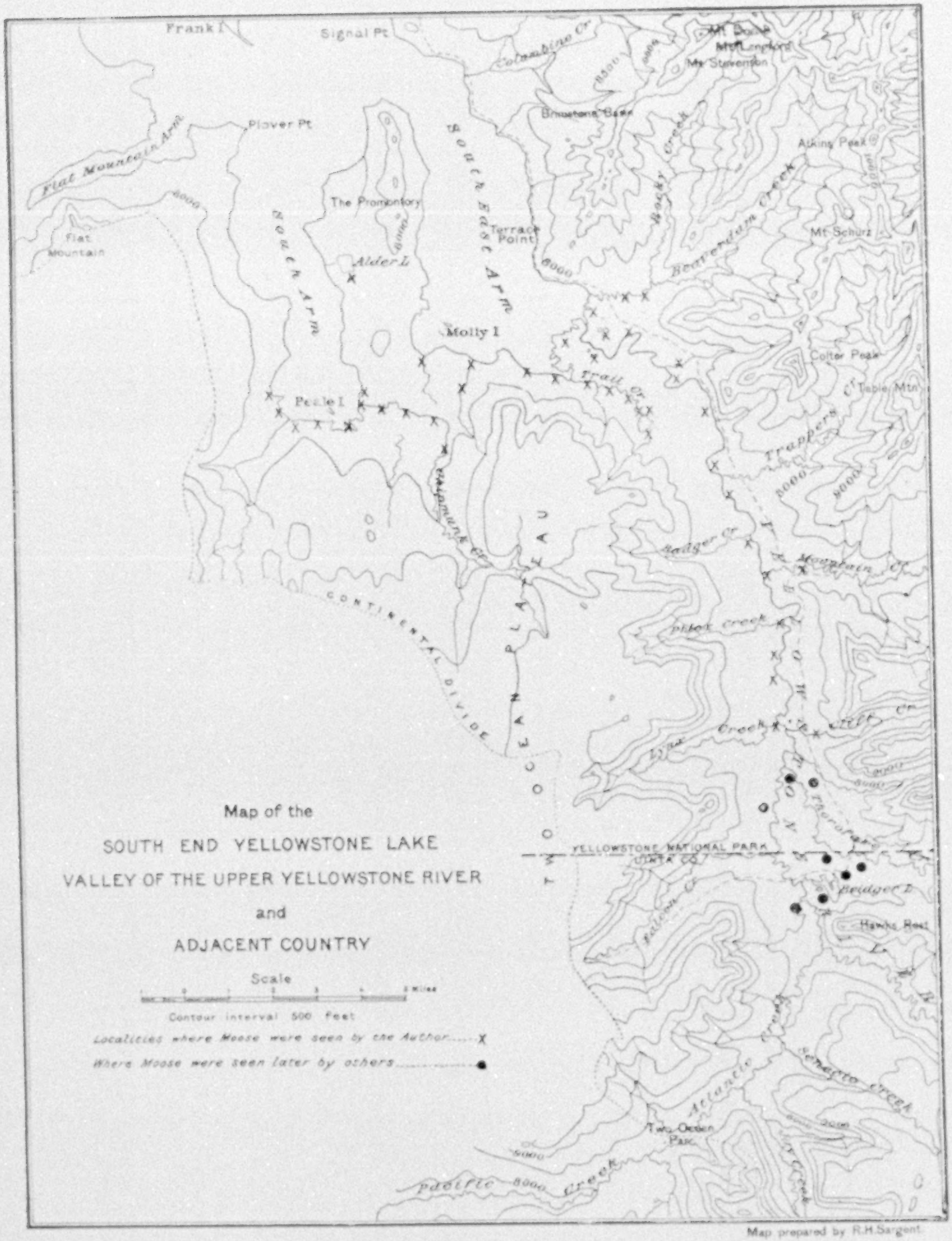
Frank I
Signal Pt
Colonel Cr
Mt Doane
Mt Langford
Mt Stevenson
Brimstone Basin
Rocky Creek
Atkins Peak
Flat Mountain Arm
Plover Pt
The Promontory
Beaverdam Creek
Mt Schurz
Flat Mountain
Alder I
Terrace Point
Molly I
Colter Peak
Table Mtn
Trappers Cr
Peale I
Badger Cr
Mountain Cr
CONTINENTAL DIVIDE
Pilot Creek
Elbow Creek
YELLOWSTONE NATIONAL PARK
UINTA CO
Bridger I
Hawks Rest
Falcon Cr
Atlantic Creek
Senaqua Creek
Two Ocean Pass
Pacific Creek
Map of the
SOUTH END YELLOWSTONE LAKE
VALLEY OF THE UPPER YELLOWSTONE RIVER
and
ADJACENT COUNTRY
Scale
Contour interval 500 feet
Localities where Moose were seen by the Author
Where Moose were seen later by others
Map prepared by R.H.Sargent

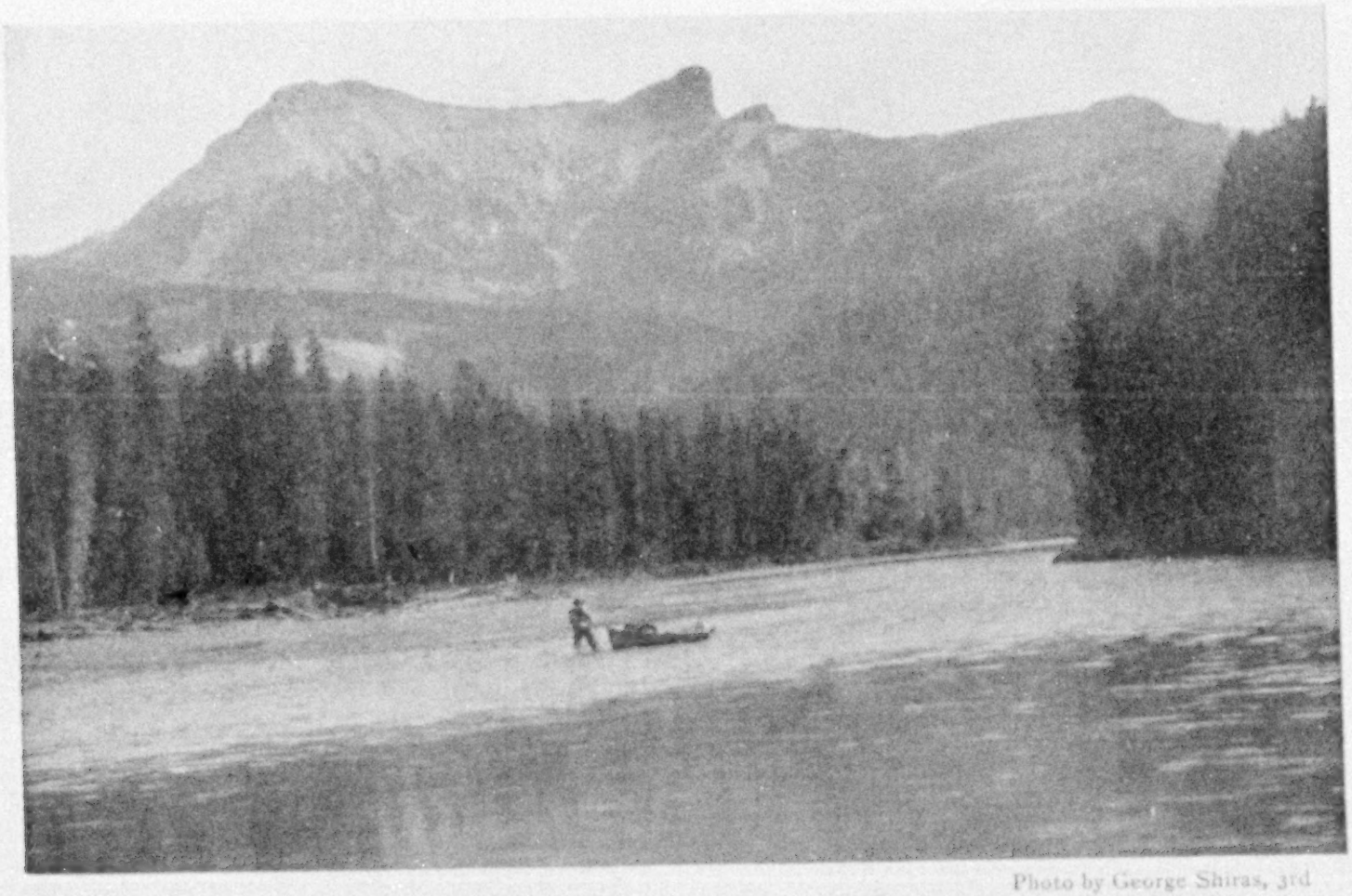

Photo by George Shiras, 3rd

VIEW OF THE UPPER YELLOWSTONE RIVER

While high water made the trip difficult in July, 1908, low water in September, 1909 and 1910, was worse. Our canvas canoe had to be pulled up hundreds of such shallows. The author can find no record of a boat getting up to Bridger Lake, though, doubtless, Indians and trappers did so before 1870.

discouraging, so I got out to lighten the bow and to have a better opportunity of looking for animals or their tracks.

Almost at once I saw some moose tracks, and as I continued on hardly a mud flat was without them. At the time this was a surprise, for, according to the park authorities, there were not supposed to be above a dozen moose in the entire park. Seeing an opening in a near-by woods suggestive of a pond, and with water warm enough for aquatic vegetation, I approached cautiously and found just such a place, with a big, black-colored bull moose in the midst of a feast.

Heretofore I had made a rule not to photograph animals in public parks or game reservations of any kind, because the lack of skill made such a pastime as unattractive with camera as with the gun and because many of these animals have lost their wild characteristics. This wary and uncontaminated creature suggested, of course, an exception; but as it is always difficult to draw the line, I concluded that the park line should still be the one to go by. So, after noting the color and size of the animal and the shape of the antlers, I returned to the river, hopeful that after crossing the boundary the camera might have another chance at an animal supposedly rare in the mountain States.

The next afternoon I walked within 50 feet of a large bull lying half asleep at the tail end of a small island, and not until the canoe came in sight did he arise. Then another bull got up further back, and as they ran off were joined by a cow—one of the few instances in which I have seen the female consorting with bulls in midsummer.

Before reaching the lake on the return trip several days later I saw six more bulls and another cow, making a total of eleven along the swift, cold waters of the Yellowstone. Doubtless a visit to

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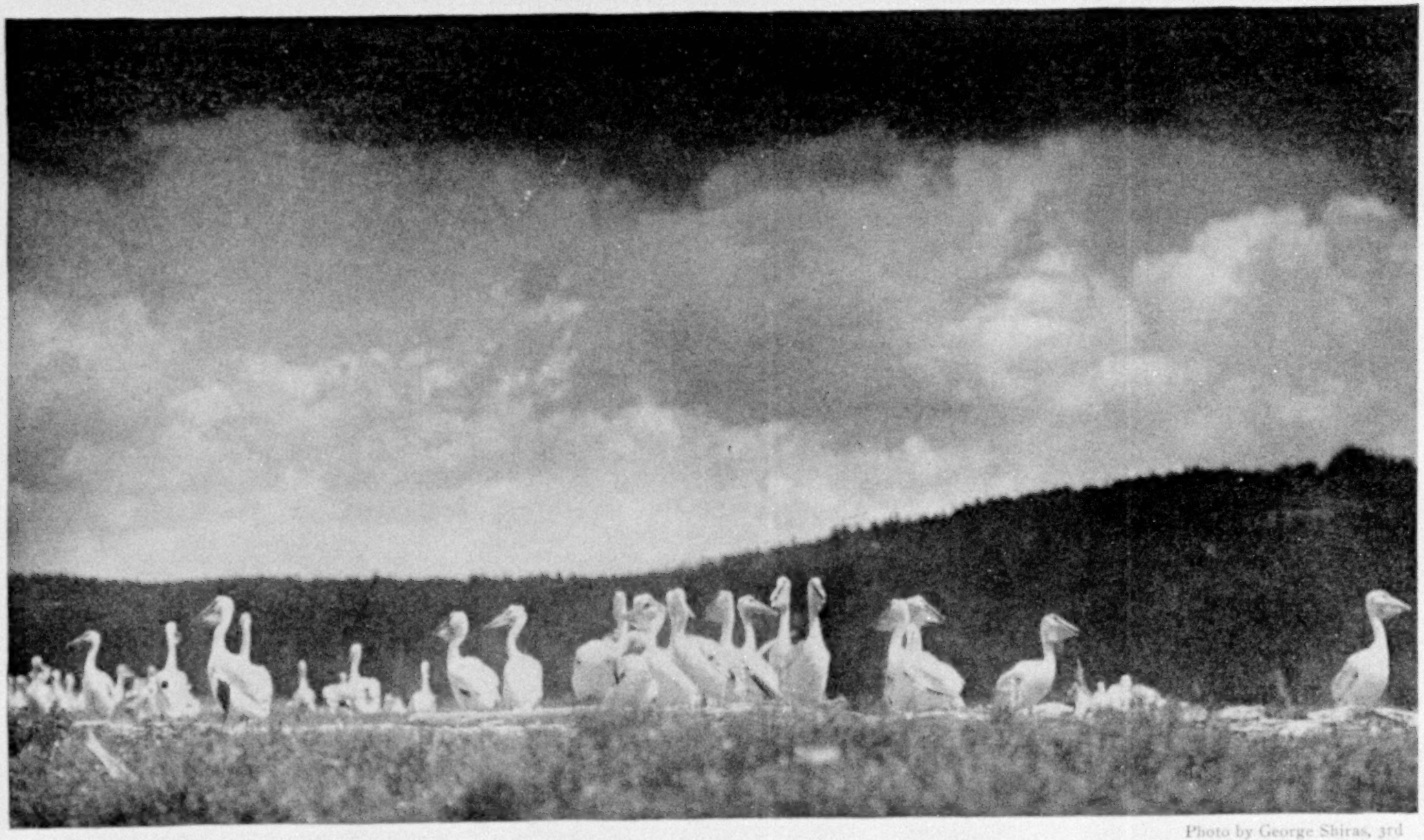

Photo by George Shiras, 3rd

A BREEDING COLONY OF WHITE PELICANS IN YELLOWSTONE LAKE

Until the author entered the southeast arm of Yellowstone Lake in 1908, it was not known whether the pelican nested on the lake or not. From 800 to 1,000 adult birds were there each season. On an adjoining island were gulls and terns

XUM

Photo by George Shiras, 3rd

A TYPICAL VIEW OF THE UPPER YELLOWSTONE VALLEY, THE HOME OF PROBABLY 1,500 MOOSE

Beneath the ridge, on the opposite side, flow the swift, cold waters of the Yellowstone, while in the foreground is Trail Creek, with two young bull moose feeding close to a beaver house (in the left foreground). This valley, situated at an elevation of 8,000 feet, is hemmed in by steep ridges varying from 600 to 1,500 feet in height, except where drainage ravines cut back short distances. The floor of the valley is level, some 20 miles in length, with a width of from 1 to 4 miles, and dotted with heavy pine forests, meadows, willow thickets, and ponds. The delta at the lake end and the diverging valleys at the head waters in Wyoming are the widest places.

Photo by George Shiras, 3rd

BIG BULL MOOSE AND TWO CALVES AT A BEAVER POND IN THE UPPER YELLOWSTONE VALLEY

In the background is one of the heavy pine forests which harbor the moose during the winter, while the adjacent willow thickets provide nourishing bark after the coming of the deep snows, just as the warm waters of the numerous beaver ponds afford the choicest of summer food. The variegated horn growth is shown here, where in one bull are two of the three prevailing types, the left antler being round and long, like that of an elk's, while the right one is heavy and broadly palmated. This great collection of moose live continuously in the valley, seldom ascending any of the hills more than 50 feet, so thoroughly satisfied are they with their yearly surroundings. It is for this reason that they so long escaped observation by government scouts.

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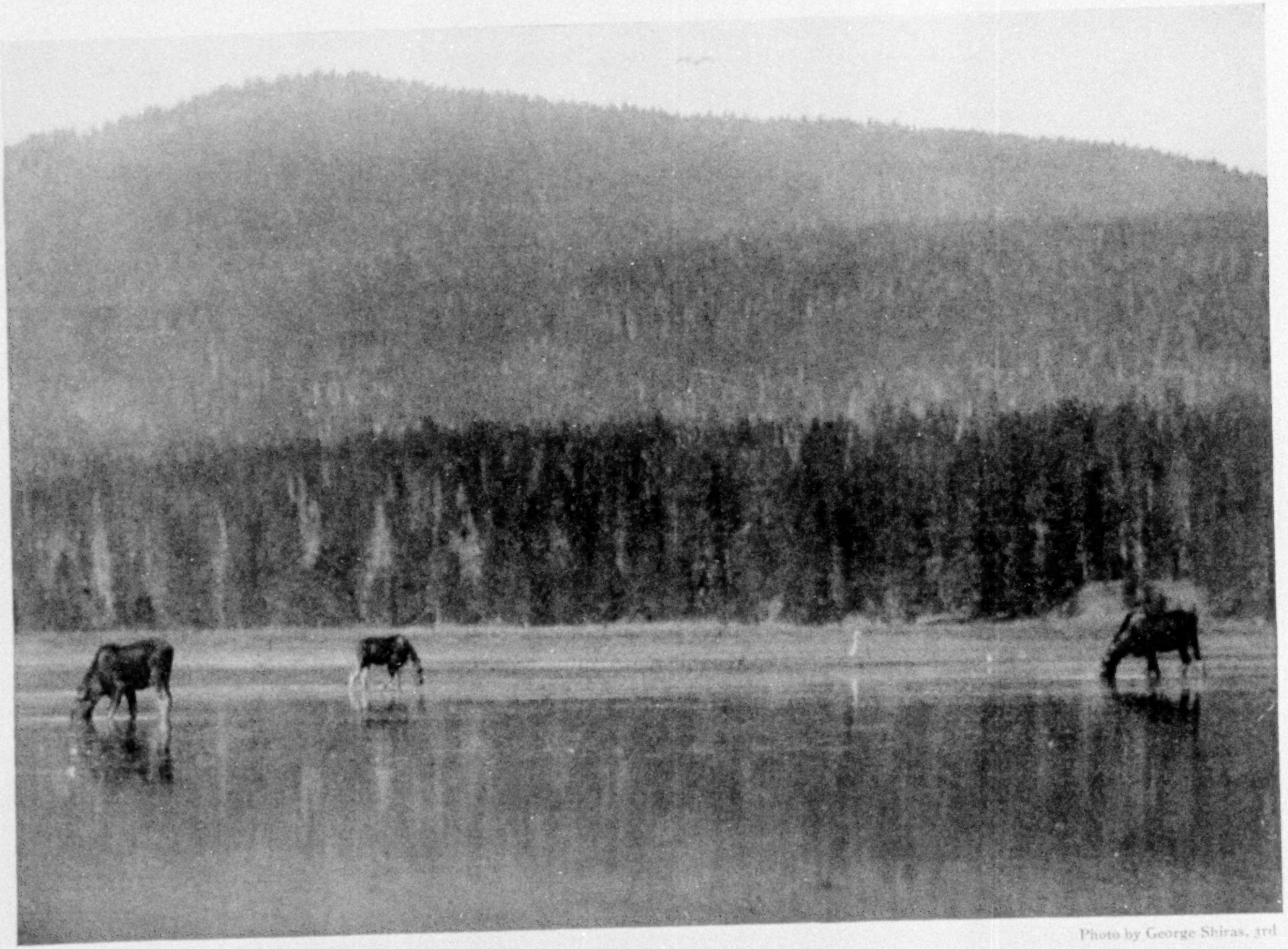

Photo by George Shiras, 3rd

MOOSE IN THE SOUTH ARM OF THE UPPER YELLOWSTONE

On the third trip to the Yellowstone Valley the author found the south arm of the lake to be the nursery of the calf moose. Twenty-one moose were seen in the shallow water at one time and several hundred about the shores during the trip. Picture shows cow moose and twin calves.

Photo by George Shiras, 3rd

BULL, COW, AND CALF MOOSE

There are dozens of ponds and beaver dams in the valley of the Yellowstone where the warm waters are favorable to the aquatic vegetation which the moose devours. About 1,500 moose are probably living in this the most populous moose country in America

Photo by George Shiras, 3rd

A COW MOOSE TAKES ITS OWN PICTURE AT NIGHT

Unlike the elk and caribou, the moose are great night feeders. This picture was taken where a moose trail led from the forest to a number of ponds

some of the small ponds and lakes in the valley, where summer food abounded, would have shown many more. Yet this area did not extend more than 8 miles in a direct line, although by reason of its circuitous course it was probably 16 miles by river.

On the third day our ascent was definitely ended by the breaking of both oars, and although spliced with copper wire they became useless in combatting the heavy currents at every turn of the river. At this season the warm weather was melting the last of the snow-drifts on the higher summits, and while the high water was favorable for reaching Bridger Lake, the current proved too strong for our outfit. In the succeeding and later seasons low water became equally trying.

But the existence and comparative abundance of moose in this isolated valley was now no longer a matter of speculation. And on my expected return the following year it would be for the purpose of estimating the number and to study their peculiarities, if any, in color, size, horn formation, and diet. And so it was with less reluctance that, after several days' rest, the canoe was turned down the rapid stream.

On passing the sand-bar where the bear had greeted us silence was the order of the day, and we glided by with all the armament in easy reach. At the next bend the canoe nearly ran into a band of 50 elk, lying drowsily in the sun on a small, sandy island, with two or three old cows standing guard. From this I concluded that the big silver-tip had deserted the neighborhood.

That night, August 4, we made camp under a high mountain at the southeast corner of the lake. I had previously arranged that the canoe would go down the shore a distance of 10 or 12 miles to Signal Point, where a big fire was to be built after dark at an elevation sufficiently high to be seen 20 miles diagonally across the lake, and on the following afternoon the launch was to come for us, as it was not considered safe to cross this deep, wind-racked lake in a canvas canoe.

And now occurred the suggested sequel in bear antics and best detailed by the camp note-book.

XUM

Photo by George Shiras, 3rd

COW AND CALF MOOSE IN A LAGOON

The cow shows a small tassel or a "bell" under the throat

ANOTHER BEAR APPEARS

"AUGUST 5, 1908—Ther., 80°-50°.

"Last night we had a surprise. I was awakened at 9 o'clock by loud yells from the guides' tent, followed by cries of 'Bear! bear! bear!' Seizing the little revolver and hurrying out of the tent, I looked about in the moonlight, but saw nothing. Approaching the guides' tent, I asked what was wrong. Thereupon Hammer, who had not yet succeeded in crawling out of his sleeping bag, said that a big bear had just seized the sack containing all our salt meat and canned goods and made off with it, an investigation showing this to be true.

"Farrell, perhaps irritated at the idea of going on short rations for two days, declared that my habit of placing bait close to the camp for the purpose of coaxing into view coyotes and other prowlers of the night was responsible for the bear's intrusion, and while, of course, it was a black bear, he was of the opinion it had not developed its thieving habits about any of the tourist hotels, since we were more than 30 miles from the nearest one by any land route. He was certain it was not a grizzly, since he never knew one to enter an occupied tent.

"The next morning, about 75 yards away, we found the bag, as well as a can that had contained raspberry jam. The contents of the latter had been extracted through perforations made by the animal's large teeth, and though pressed nearly flat the can was otherwise unbroken.

"On thinking the matter over, I now felt entitled to make one exception to photographing animals in the park, and that I ought to remain that night for the purpose of taking the bear's picture by flashlight, as it was quite certain that he would return in search of another feast. The guides, viewing the matter from a humorous and not a photographic standpoint, thought it would be a good joke on the bear. It was thereupon agreed that the two guides should take one tent and paddle down the shore to Lookout Point, where the signal fire would be built, and then on the following morning they could

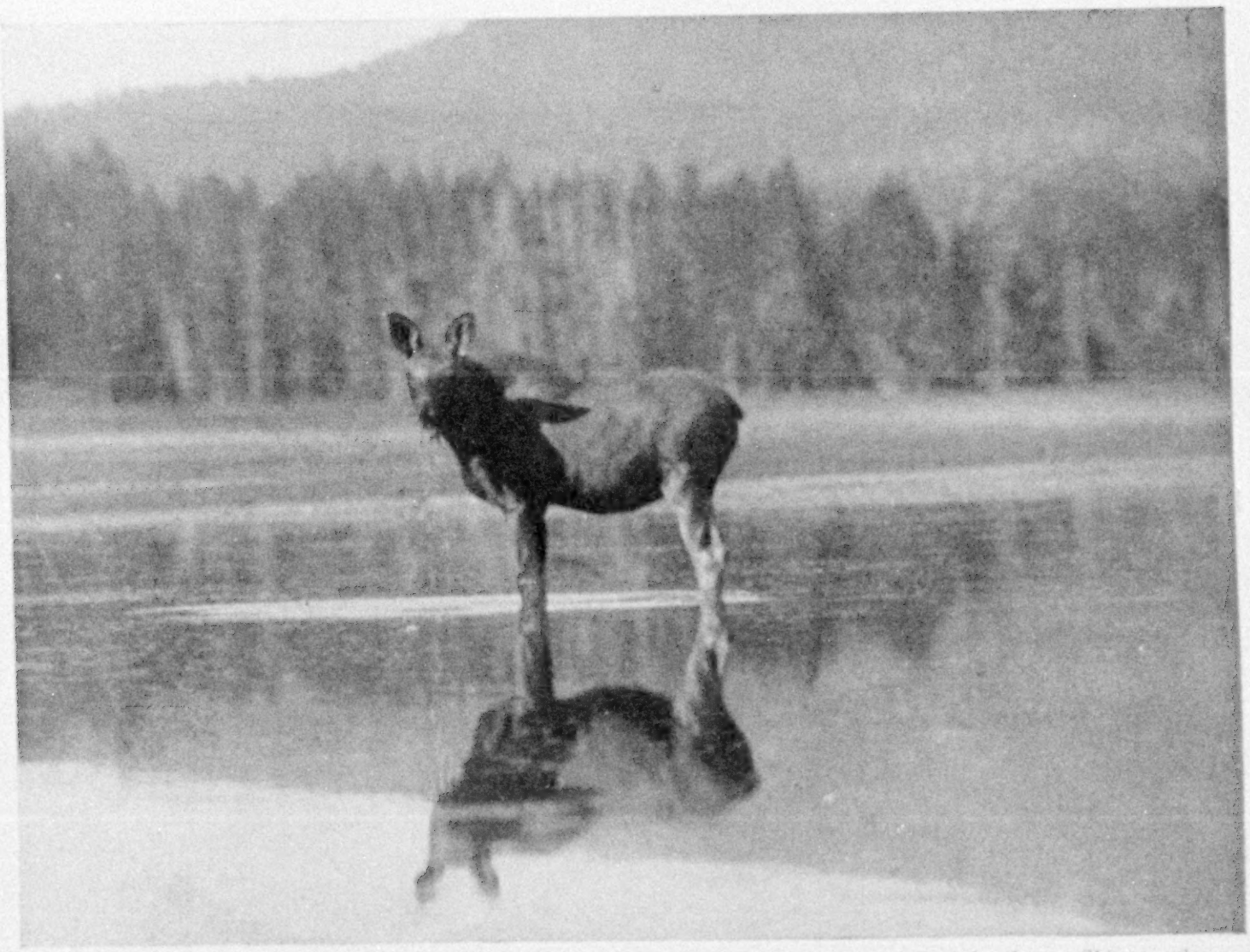

Photo by George Shiras, 3rd

MOOSE CALF

This animal was found feeding some distance from its mother and was approached to within 15 feet in a canvas canoe covered with pine brush. Note its splendid condition and the reflection in the water.

return for me in plenty of time to be picked up by the launch.

PREPARING FOR THE FLASHLIGHT BATTLE

"After the men had passed out of sight, I began preparations for the coming bombardment. The little table, made of driftwood, in front of the guides' tent, had been left standing, and on this I placed two cameras, facing down the elk trail. To a stake 30 feet away were hung some trout, with a string running to the flashlight apparatus. Impatiently I awaited the coming of twilight, sitting for a time on the edge of a hill watching some moose feeding in ponds a few hundred yards this side of the river.

"As the day declined the light of the nearly full moon became so brilliant that I could see plainly 75 yards down the trail. I was surprised, as time passed, that there had been no signs of the bear, and at half past nine concluded to lie down in the sleeping bag, where I had not been more than five minutes when a metallic click indicated that a bear or some other animal had pulled the string of the flashlight machine and that it had missed fire. Hastily looking out of the tent, I saw a large, dark animal leisurely devouring the fish, and knew it had already thrown open the shutters of the cameras; but, in the absence of an illuminating flash, the effort was a failure.

"For a minute this was disconcerting, until I recollected I had a hand flashlight apparatus, loaded for any emergency, and that by crawling to the cameras I could fire this and get precisely the result that would have been obtained had the other one gone off.

"This plan I attempted to put into exe-

Photo by George Shiras, 3rd

COW MOOSE AND CALF

These animals were found in a pond back of the south arm, in a beautifully wooded district of the upper Yellowstone

cution, but just as the finger was pressing the trigger came a deep "waugh" and then the sound of a heavy animal running away. Looking over the cameras, I saw the bear galloping down the elk trail and disappearing around a bend.

"Examining the apparatus, I found that the safety catch had not been withdrawn, and the firing pin, in striking an intervening piece of steel, made the click mentioned.

ANOTHER SURPRISE

"For several minutes I worked away resetting the shutters and adjusting the string, when I became aware of heavy breathing close by, and in some trepidation looked about, but could see nothing. Raising up slightly, so that I could see over the stand, there, within 5 feet of me and sitting on its haunches, was a huge silver-tip grizzly. The bright rays of the moon fell directly upon the head and breast, while the little, beady eyes stared at me steadily, the half-open mouth showing a fine set of teeth. And this was Farrell's "black" bear, and my guides sitting by a glowing fire a dozen miles away!

"To run for the tent, where were my revolver and axe, seemed a dangerous proceeding, for visible evidence of fear invites attack from any dangerous animal, wild or domestic.

"An instant later I realized safety was at hand, for, reaching out, I cautiously picked up the hand flashlight. By shoving this close toward his face and firing it, closing my eyes at the same time, the animal would be so blinded for several minutes as to be unable to see, and in the interim I could reach the tent, even were he disposed to be ill-tempered after such a greeting.

"Realizing this, I looked at the bear with more composure, trying to figure out the best way of making him depart without alarming him too much. Finally I gave a low, steady hiss; whereupon he came down on all fours, and descending the bank, passed through some thick bushes, where I could hear him walking along the gravelly beach.

Photo by George Shiras, 3rd

NIGHT PICTURE OF A SILVER-TIP GRIZZLY: THE FLASH FAILED PHOTOGRAPHICALLY, BUT PROVED A GOOD BURGLAR-ALARM

The nearest tree on the right was knocked down by the bear when blinded by the flash

MAKING READY FOR THE SECOND EFFORT

"By this time I had made up my mind to give the silver-tip a surprise the next time; so, removing all the flashlight powder from the hand flash, together with some I had in a box, I added all this to the original load, placing on top of the powder a large flat stone, for the purpose of increasing the speed of the flash and so that the noise would awaken me, were I asleep, besides letting the bear know that something was happening.

"Hurrying back to the tent, the hand flash was reloaded and the axe and pistol put in easy reach. An hour passed, and finally it had become half past eleven, but no bear. Worn out with continual watching, I once more thought it best to get into the sleeping-bag.

"Whether it was some presentiment, after undressing, I went once more to the front of the tent, and sticking my head out through the narrow opening, had just gotten it around far enough for my right eye to see the cameras, when a large shadow seemed to flit across the camera stand, as if the flight of an owl had cut off the direct light of the moon.

"Before this impression had more than suggested itself, from the table came a dazzling burst of light such as I had never seen equaled by any bolt of lightning. It shot high into the air and extended on either side many feet. Several whirling missiles cut through the pine branches above the tent, while a roar like that of a cannon added to the excitement. An instant later the flat stone came down, striking the edge of the tent.

"My right eye was, for the time, useless; but twisting my head around, I saw a large gray object roll down the bank from the camera stand and land in the bushes, where there was a great thrashing about for a moment, and then up the bank came the big silver-tip, headed almost directly for the cameras, missing them by a foot or two. A yard further on the bear struck a tall poplar with his left shoulder, the slender tree coming to the ground with a crack and a crash,

Photo by George Shiras, 3rd

ELK AT SOUTH END OF YELLOWSTONE LAKE

Along the outer shores of the south and southeast arms and on the big promontory were numerous elk, while throughout the river valley they occupied the hills above the moose, coming down often to feed in the valley meadows. They ate willows to some extent, about the sole dependence of the moose in winter; but by October 1 began migrating to lower ground. The above picture shows a big bull and his family migrating south.

having been broken off at the base without being uprooted. The animal, tripped and thrown to one side by the collision, rolled over on its back and for a second lay there motionless, with four big feet sticking rigidly up into the air. Then he scrambled up again, and I saw that he was headed in the opposite direction from that in which he had been going; so he had turned a complete somersault—quite a performance for an 800-pound animal. But all sense of direction had been lost, and with another rush the bear passed the cameras and shot out over the bank, catching with his feet, as I discovered later, a large boulder, and together they went in a heap to the bottom.

"By this time I was beginning to chuckle. The next move was a plunge through the fringe of bushes between the elk trail and the lake shore, and 75 yards away I saw him cross into a small gully, up which I could trace his going and, later, his ascent of the mountain slope by the rolling of the loose stones and shale. Finally all was still save the silvery ripples breaking on the beach.

"Examining the seat of war, I found that the huge flash, placed entirely too near the cameras, had burned most of the leather off the boxes, and little was left of the flashlight machine except the bedplate. The leaves on the overhanging poplars were burned or whitened for a distance of 30 feet, and altogether the place presented a scene of devastation.

"Looking the ground over in front of the cameras, I saw where the bear had made the first whirl as the flash exploded, when he was not over two feet away. While I was gazing from the tent the bear evidently had been standing erect, possibly wondering whether the bright barrels of the lenses contained raspberry jam, as sugested by his experience the night before, when his teeth pierced the can of jam. As he dropped upon all fours it gave the appearance of a

Photo by George Shiras, 3rd

BIG BULL ELK WALKS HEAD FIRST INTO FLASHLIGHT STRING

Here the camera and flashlight machine faced the opening between the stake and the tree on the right. The big bull probably caught the string in his antlers.

shadow, and in the descent his body had struck the string running from the flashlight to the bait. When the explosion occurred his head and shoulders must have been within the radius of the flame and fumes.

"Is it, therefore, any wonder that he was surprised at the demonstration? Possibly in his cubhood days he had become aware of the danger of putting his feet in the boiling geyser springs, and possibly he had some sad experiences sniffing in vent holes filled with sulphurous steam, but I doubt if he had ever dreamed of anything that equaled this."

A week later the negative was carefully developed, though certain to be a failure from the close proximity of the bear and the heavy charge. The reproduction of this scene appears on page 829.

While the flash failed photographically, it was quite a success as a burglar-alarm, and no one need fear of any camp ever being invaded again by the singed grizzly of the Upper Yellowstone.

SECOND AND THIRD TRIPS ON THE UPPER YELLOWSTONE

On the 30th of August, 1909, smoke curled from our fire at the camp site made memorable by the robber bear of the previous year. Guide Farrell was then in Alaska, and his local successor viewed with interest the stricken poplar, picking up a bunch of grizzled hair still adhering to the bark. It may be here observed that on this visit not a bear was seen, and only one at a distance the following year. Yet daily dozens of brown, black, and grizzly bears grow fat and in-

Photo by George Shiras, 3rd

A COW ELK TAKES ITS PICTURE AT NIGHT

During the rutting season of the elk, in September, 1910, they moved about some on the full of the moon. The camera had been set for moose, but got the best female elk picture in the author's collection

dolent at the garbage piles behind the park hotels, and it has been estimated that each season more than 5,000 pictures are taken at distances varying from 5 to 100 feet. Ordinarily so wary and secretive are these animals that photographing them is a difficult task, and I can only recall two good pictures of bears taken in the wilderness. Thus no more striking reason can be given for the camera hunters passing by such animals when they have become tamer than many kinds of domestic stock. If pictures are taken in game reservations the conditions under which they are obtained should be clearly indicated.

At the urgent request of the former superintendent, General Young, and repeated by his successor, Major Benson, I consented on my next trip up the river to Bridger Lake to take a series of pictures of park moose, because, as they said, upon such tangible evidence the existence and abundance of these animals would be more readily established in the minds of those not familiar with my investigations or the verbal report made thereon. So far as known, not one of the 200,000 tourists in the previous 15 years had seen a moose within the boundaries of the park, and this, it was contended, warranted the waiver of my rule.

In the accompanying pages are a few of the moose the camera saw, and they represent a still smaller fraction of those seen at a distance or when the failing light made the camera useless. On this trip I counted some 300 moose, allowing when possible for duplication on successive days. During one afternoon, from an outlook on the mountain side, I saw 19 feeding at one time and all within a radius of a mile.

On the way up the river I looked particularly for shed antlers, finding a number along the banks and many more in the willow thickets, where the moose browsed in winter time. Selecting a dozen of the best, they were brought out, the residents at Gardner expressing astonishment at an antler they had never seen in Montana before yet the animals that once bore them lived hardly 50 miles away. This collection, now in the possession of the Biological Survey, represents three distinct types, with several intermediate forms—variations due, doubtless, to the high altitude of the valley and the inbreeding of the original stock. In the southeast arm and up the valley to Bridger Lake I saw comparatively few cows with calves early in the season.

On the third trip, made during September and October, 1910, we camped two weeks in the long south arm of the lake and found this locality to be as little frequented by man as that on the other side of the dividing promontory, although a beautiful island in the center of the bay affords a splendid camping place, and from it we watched the moose and elk day after day. Here we found the nursery of the cow moose, and fully 80 per cent of the 400 seen were cows and calves.

On the second afternoon 21 moose, including two bulls, were seen at one time in the shallow water of the bay—a sight rarely witnessed in the districts where this animal is deemed most abundant. It was now the mating season of the elk, and no more exciting scene can be imagined than the great bulls fighting for supremacy, while the cows and calves looked on with awe. As late as October 1 not half the bull moose had their antlers free of velvet, and consequently were in a less combative mood than the elk.

I think it can be safely said that there are 1,500 moose living throughout the year in the valley of the Upper Yellowstone, an area 2 to 5 miles wide and 20 long. Until a visit is made in midwinter on snow-shoes, when the animals have yarded, it will be impossible to estimate the number accurately. On the accompanying map, page 818, an x has been used to designate where moose were seen during the three seasons of investigation. On the shores of either arm of the lake the x mark shows the farthest the animal was seen to the north, while at intermediate points they were more or less abundant. Since my original trip many of these animals or their offspring have taken possession of smaller valleys in the park, and many others have reached

Jacksons Hole—all the result of a safe refuge—making possible the restoration of this splendid animal in the adjoining States, provided they are adequately protected.

THE CAMERA IN THE CONSERVATION OF WILD LIFE

The feeling which I have so strongly expressed for the camera as the better medium for testing one's skill in the pursuit of wild animals and birds, in acquiring a knowledge of their habits, and finally in getting a sufficiently satisfactory and enduring trophy, may create the impression that the author looks with considerable disfavor upon those who hunt with a deadlier weapon. Very much to the contrary is the case whenever the sportsman shoots in moderation and is willing to coöperate in the efforts to conserve the game supply by shorter seasons, by the establishment of game refuges, and in the elimination of the market hunter.

For it must be kept in mind that were all wild game given continuous protection and their predaceous enemies destroyed the world would soon be overrun and a menace arise threatening not only the comfort, but in many cases the existence of man himself, while in the end the rigid protection of all the supposedly harmless wild creatures would result in the eventual starvation of many.

An example which may be cited is the great and steadily increasing elk herd of Yellowstone Park, where the original and timely preservation of this animal has saved a species permanently for the Rocky Mountain States. Yet so abundant has the elk become, under continuous protection in its refuge, that during severe winters thousands die of starvation in the foothills, and many pictures have been taken of the animals gazing wistfully at the well-guarded haystacks of the Jackson Hole settlers, and finally dying within a few feet of food necessarily reserved for the domestic stock of such settlers.

The sentimentalist who decries the killing of all game birds and animals is not infrequently one who grumbles when a joint is tough because, forsooth, the lamb was not killed earlier in its gambols. Such sympathy is inconsistent and such reasoning purely selfish.

For the explorer, trapper, miner, homesteader, forest rangers, and all who love to dwell for a few months in the wilderness, the utilization of fish, birds, and animals is, of course, wholly justifiable.

On the other hand, the market hunter, who converts the products of his gun into dollars, is not one who can be expected to change his methods, and therefore the present appeal is intended for a large class of sportsmen, who do not depend upon game for a food supply and make their excursions into the wilderness or upon the waters under the influence of another incentive, and whose efforts are misdirected in the means employed.

The successful wing-shot, who enjoys plucking from the air a bird on its meteoric flight across the sky, can, if he tries, capture one, a dozen, or 100 within the confines of a sensitive plate, while a marsh scene or the rolling breakers give a life view in striking contrast to the pathetic heap of bloodstained, rumpled feathers marking at the close of day the accuracy of his aim. So, too, the big-game hunter, rewarded in his quest for an antlered head, may continue on during the remainder of his woodland visit taking many more, but in a way that neither lessens life nor the enjoyment of the hunter.

UNTOURED BURMA

By Charles H. Bartlett

BURMA: What does that suggest to you? You know it to be one of England's possessions in the East, and if you have circled the globe you recall having touched at Rangoon. You remember the Shwe Dagon Pagoda and the "Burmese maid," with her "whacking big cheroot." Perhaps you ran over to Mandalay by train, slid down the river by boat to Prome, and rejoined your steamer by train to Rangoon. At least, assuming you to be the average tourist, this will nearly comprise your impression of Burma.

Yet you will have seen nothing of the Burmese people nor of Burmese country. Your guide was probably a Madrassi (of no caste); all the gharri drivers are Indians and many shop-keepers are from India or Armenia. Some Burmese there are (in the small shops you find their women), but they are quite metamorphosed, brought up to date, as it were.

The commercial development of Burma has been for the most part Scottish. It is *British*, but not *English*, and therein lies a distinction familiar to all who know England and the English. One arrives in Burma only via English settlements and by English steamers, and usually without that enthusiastic interest which disposes one to incur discomfort and to overcome difficulties.

Burma is governed as a department of India. Her taxes are all paid into the Indian treasury, and her Scottish residents complain bitterly of the policy which doles out such funds as are appropriated for local improvements and the development of the country. Nothing has been done in the way of road building except for a few miles around Rangoon. There are no good roads in fact and no spring wagons outside the large towns. For conveyance in the country there are only the native bullock carts, without springs, and here are none of the trotting bullocks of India, even could one endure a gait faster than a walk over the rough trails, which are the only roads.

The Burmese have not reached the stage of development requiring hotels; hence there are no Burmese hotels. Those in the large towns, for foreigners and supported by foreigners, are bad and very dear.

Yet Burma is a country of surpassing interest, and once outside the triangular tourist's path, bounded by Rangoon, Mandalay, and Prome (none of which is typically Burmese), one may journey at will among a simple, happy, kindly people, still very young and wholly unspoiled by contact with the West. It is a country of mystery, where *nats* (nature spirits) still dwell in mountains, trees, streams, and temples—a country inhabited by many tribes, widely diverse in customs and physical characteristics, living as they lived 1,000 years ago; tribes among which the Burmese are only one, but happened to be in the ascendant at the moment of England's conquest of the country.

Much of this country may be reached by the Irrawaddy and its estuaries, where a comprehensive service is established. For such a journey only a single servant is necessary, as in India or Ceylon.

THE NECESSITY OF A PERSONAL SERVANT

If the traveler arrives from the East, he will secure a "boy" at Rangoon. Usually the "boy" will be a Madrassi, a no caste—that is, an outcast—and so may do any sort of work without trenching on his religious principles. He is usually a worthless, no-account fellow, whom no resident, white or native, will employ.

If Ceylon is visited first, the Cingalese servant from there will be far and away superior to the Indian. The writer kept his Cingalese "boy" throughout India and Burma with satisfaction. He had "caste," and so did not carry luggage, prepare baths, nor do other menial labor, but he saw efficiently to the doing of all these things, waited on us at table, cared for our chambers, made our purchases of supplies, paid the coolies, arranged the tips; in fact, assumed full responsibility for all petty details, leaving us free

XUM

TEMPLE ON EAST SIDE OF THE SHWE DAGON PAGODA; RANGOON

Unlike the pagodas, which are substantially built of brick, almost all the temples in Burma are constructed of wood. They are light, graceful buildings, generally embellished with intricate and often singularly beautiful carving. They are but one story high, crowned with a succession of roofs diminishing in size as they ascend, thus producing a spire-like effect.

THE ENG-DAW-YD PAGODA: BURMA

Pagodas greet the traveler everywhere in Burma, and are the centers around which the religious life of the people revolve. There is at least one at every temple, and more than one at every monastery. A pagoda is a solid edifice of brick in the form of a cone, and in many cases raised over a tiny relic chamber. There is no interior, the place of worship being the surrounding platform. Many of them, as, for example, the famous Shwe Dagon at Rangoon, are covered with pure gold leaf from base to summit, and making benefactions for their upkeep is a favorite way of acquiring merit.

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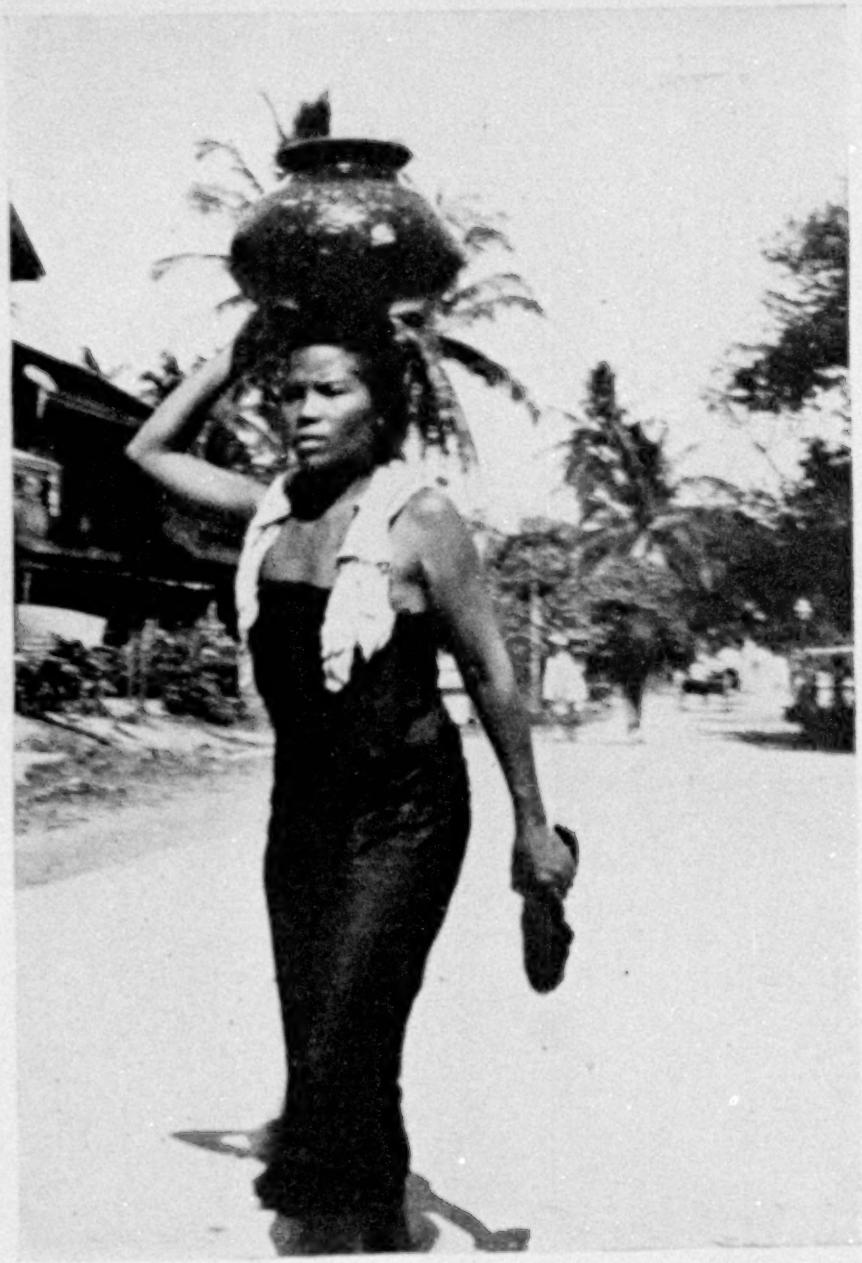

Photo by Samuel R. Stern

RETURNING FROM THE RIVER

The Irrawaddy is to Burma something of what the Nile is to Egypt: It is the great highway of the country; its waters irrigate the great rice fields and serve as a water supply to the towns along the bank. The Burmese, both women and men, are passionately fond of bathing, and this picture shows a girl in the streets of Prome returning from her morning bath, with the day's supply of water on her head.

Photo by Samuel R. Stern

BURMESE LADY SMOKING

From the cradle to the grave the Burman is never without his cigarette; men, women, and children seem to smoke all day long. The Burmese cigarette—a fearful and wonderful thing, between 1 and 2 feet long and seldom less than two inches in diameter—can easily serve as a weapon of offense and defense. One cigarette often serves as a day's smoke for an entire family, each member taking his turn down to the baby who can scarcely walk.

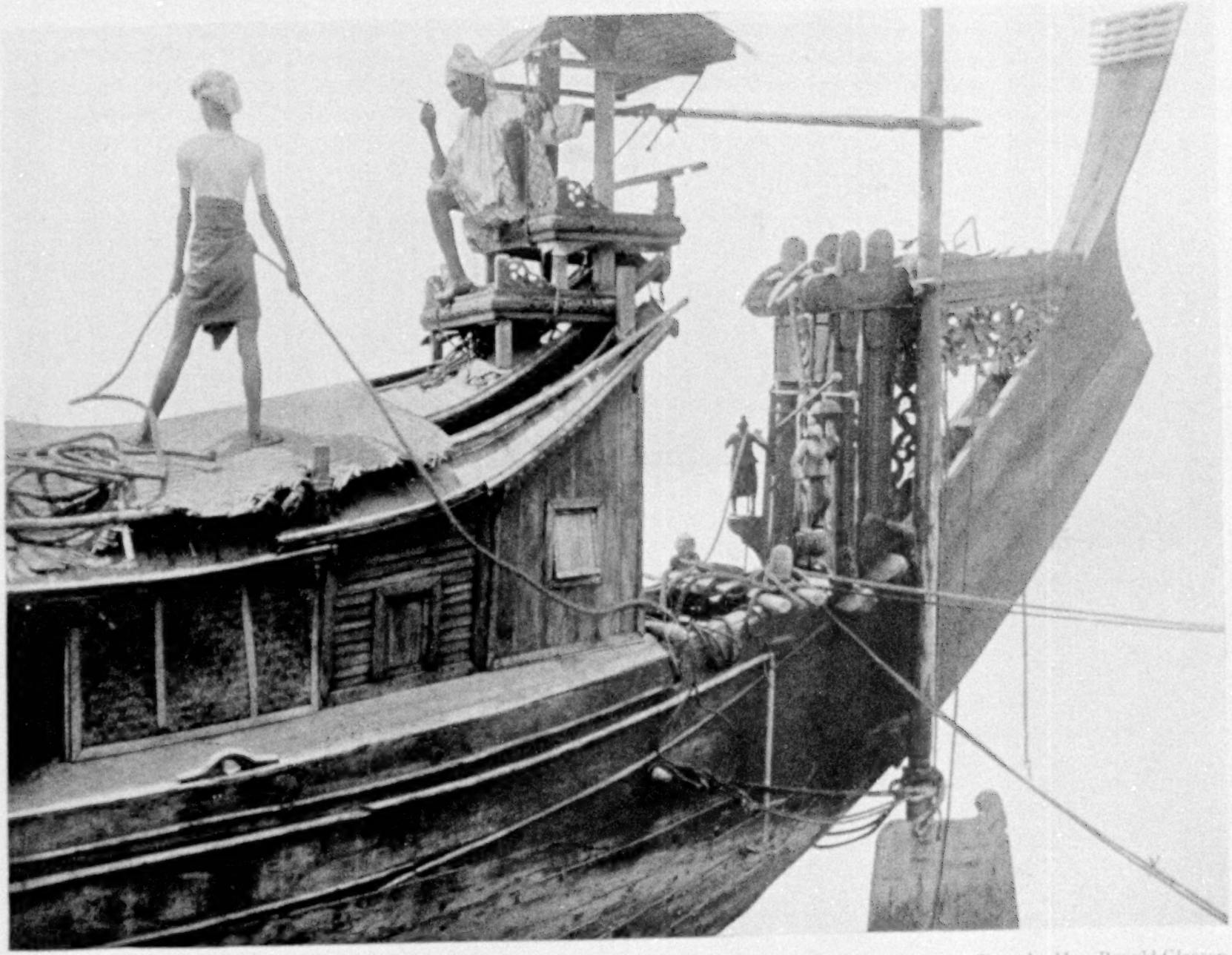

Photo by Mrs. Ronald Gleason

THE STERN OF A RICE BOAT ON THE IRRAWADDY

"The whole is roofed over with arched bamboo rods, covered by matting. At the stern a high poop deck gives the craft its characteristic appearance and forms a sort of throne for the captain steering. These boats are propelled by poles and paddles up the narrow creeks, or spread great square sails of palm fronds on the open river when the wind is fair. The owner and family often live aboard" (see page 842).

Photo by Alfred Joseph Smith

PALAUNGS FROM THE HILLS

The Palaungs wear a loose jacket of some dull color, faced with scarlet or bright blue velvet. The tribe to which they belong may be known by the width and color of the stripes running horizontally around their short skirts. Rich Palaungs wear loose belts—broad and plain—of solid silver in addition to many cane girdles. It will be noticed that the camera did not make them feel very happy while posing.

for the full enjoyment of the journey. The small fees he distributed for the menial labor he ordered instead of doing was no doubt a fair offset, at least to the dishonest extortion of the average Madrassi, and his dignity, honesty, and uniform courtesy so endeared him to us that our parting was one of real regret. That "boy" stands out as one of our happiest memories.

For a more extended journey, involving the necessity of leaving the waterways, some provision must be made. A bedding outfit will be needed, and the same which would in any event be purchased for India will suffice here. Then such supplies and cooking utensils as will enable one to do his own catering (fresh eggs and chickens may be purchased en route), and in addition to the "boy" he would have in any event, a cook will be needed. A Mugh cook is the best if obtainable. Some mosquito netting should not be overlooked.

WHY MEAT IS DIFFICULT TO OBTAIN

Thus equipped, an extremely interesting journey may be made. For instance, through the Shan States northward to the ruby mines or the oil fields, thus passing through the country of several interesting peoples. If the luggage be in convenient sizes (not exceeding 50 or 60 pounds each) for packing on mules, and

Photo by Alfred Joseph Smith

PALAUNG BEAUTIES: BURMA

The richer Palaung women wear curious necklaces of silver, flat and quite plain, and sometimes so large as to reach down to the waist. Around the wrists are heavy twisted bracelets of solid silver, and many of their cane girdles are embellished with silver wire. The Palaungs are a quiet, well-conducted set of people, sober and hard-working, and, unlike most of their neighbors, far from warlike.

saddles be taken along, more rapid progress may often be made. The weather, except for a few rainy days at Christmas time, is good for the most part from December to March.

At any town the subdivisional officer ("S. D. O." for short) will assist in procuring carts or mules, and his good offices will often be needed to requisition chickens. The Burman does not take life, and sometimes refuses to sell chickens to be killed. A law obliges villages to furnish supplies (to be paid for, of course) for officers and troops passing through. This shrinking from the taking of life, a characteristic which the Burman shares with the Hindu, is not from the teachings of Buddha, who is said to have been an eater of flesh, but is a relic of some belief or superstition antedating Buddha. It is very real, however, and kill he will not, not even a venomous snake or tarantula.

Except for the law, an officer would be reduced to what he could carry with him, so far as flesh of any kind is concerned. No one would kill, or furnish to be killed, any live thing. Thus when we stayed in a government "Circuit House" at Pagan, there was a cook and a caretaker, a well-furnished house and kitchen; but the S. D. O. gave a village headman orders to levy such chickens, etc., as we might require. *We* gave the orders, and so the sin of killing fell on us. No need for the S. P. C. A. among the Burmans! The town gharri drivers are never Burmese, they believe horses so used cannot be kindly treated.

Dak bungalows are to be found nearly everywhere, though often only shelters and not always provided with crockery and cooking utensils. There are many very comfortable "circuit houses" built for and used by the government officials,

Photo by Alfred Joseph Smith

BURMESE COUNTRY FOLK

The Burmese are possessed of a gay and lively disposition, and have often been called "the Irish of the Orient." They are more independent, but less practical than the Hindu, while they have not the keen business instincts of the Chinaman; and as both these people have entered Burma in considerable numbers, the native has now to fight for his economic supremacy.

who are very courteous to any properly accredited travelers.

THE GREAT RIVER HIGHWAY OF BURMA

On the other hand, though on land one must travel in the saddle or by bullock cart, the Irrawaddy River and its estuaries offer a superb highway, with an adequate steamboat service. If the cargo boats be chosen, many small villages will be visited, and often there will be time enough to stroll through these villages; or, when tied up at night, to attend a *pwé*, which, in the form of a dance or other entertainment, is of frequent occurrence when the moon is full. These are always free, and all the world is welcome to the "treat" some villager is giving.

Especially is the river journey interesting above Mandalay, and one may go as far as Bhamo, some 1,500 miles from the mouth of the Irrawaddy.

The commercial activity of the country follows the Irrawaddy, and there are yet hundreds of small native craft which carry much of the rice to market, returning with supplies for the people dwelling on the small tributaries of the great river where the steamboat does not go. These craft have hulls of great logs "dug out" as our southern Indians built their canoes. The whole is roofed over with arched bamboo rods, covered by matting. At the stern a high poop deck gives the craft its characteristic appearance and forms a sort of throne for the captain steering. These boats are propelled by poles and paddles up the narrow creeks, or spread great square sails of palm fronds on the open river when the wind is fair. The

Photo by Helen Woodsmall Eldredge

A BRIDE AND HER ATTENDANTS AT A KACHIN WEDDING: BURMA

When Kachin girls are of marriageable age they leave their homes at night, with the consent of their parents, to stay at a house set apart for the purpose. There they meet the bachelors of the village and choose a husband from among them. The formal wedding takes place when the girl is quite sure which man she wishes to marry. After the ceremony she walks to her new home between rows of pigs, which are slaughtered as she passes, their blood wetting her feet.

owner and family often live aboard (see page 839).

Here and there wallow herds of half-wild water buffalo, and now and then appear enormous elephants, beside which the native and his tiny hut look like toys.

The moonlight nights are entrancing, with the gauzy mist over the paddy fields (rice is "paddy" till it is harvested), while from some near-by pagoda comes the musical sound of gong or hollow tube as the kneeling worshiper attracts the attention of his gods. Everywhere one hears the rhythmic "thump, thump" of wooden tamps in long hollow troughs as the rice is threshed, often to the sound of music; for the Burmese dearly love to work to such accompaniment.

THE PAGODA CITY OF THE OLD KINGDOM

Going up the Irrawaddy, there is nothing of special interest below Mandalay, except the ruins of Pagan, which richly repay a visit. Here, scattered over a considerable area (some 8 miles along the river and 2 miles wide), lie the ruins of a city the story of whose building and decay vie in romantic interest with that of Carthage. Here were once thousands of pagodas, some very beautiful; and a few, in a fair state of preservation, still exhibit the varied styles of the peculiar architecture of the time and country.

It was about the beginning of the Christian Era that Pagan was founded; but 1,000 years later, Anawrata, King of the Burmese, made it the great city known to history. It seems that a hostile tribe dwelling on the shore at Thaton had received direct from Ceylon—center and head of the Buddhist faith—the pure doctrine and teachings of Buddha. The Burmese king sent to this tribe, asking for copies of these "books of the law," but was refused.

Therefore he went in person with an army, destroyed the capital of this selfish people, and took back with him not only the books of the law—seven elephant-loads of them—but the king's wives, his

XUM

GRAVE OF KING MIN-LIN MIN : BURMA

These royal tombs are among the finest specimens of Burmese architecture. They are built of brick and stone, elaborately carved, and are bright with gay colors and gold leaf. Like the pagodas, they always stand on a broad square pedestal, which elevates them some distance above the ground.

SHANS LOADING COMMISSARIAT STORE

These great hats are worn by all Shans—men, women, and children—and when new have the appearance of shields rather than hats. To look down on a market-place in any of the Shan States is like looking on a field of gigantic mushrooms. So great is the size of their headgear that in narrow passages the people often have difficulty in passing each other.

architects, builders, and principal craftsmen. Them he commanded to build him a city. Thus runs the story, and though Pagan was never a religious city in the sense in which Lhassa, governed by monks, is a religious city, it came to have a great many pagodas, thousands of them (later one ruler is said to have used 4,000 of them at one time to build fortifications); and some of the best of these, in better or worse state of preservation, are all that remain of ancient Pagan. Excavations are being made under the scholarly S. D. O. (a native Burmese who was a sort of secretary to the last king), who has uncovered some very interesting buildings.

Pagodas were built of stone and brick and so remain, while the palaces of the king and his people, uniformly of wood, have long since disappeared. From the 10th to the 13th century Pagan was a celebrated center of Buddhist learning. Fugitive bands of Buddhists from India

A GROUP OF CHINS

The Chins are the wildest of all the tribes in Burma. They are hillsmen from a range which runs along the boundary between Burma and Bengal, which was included in the former country in 1895. Up in these hills the power of the British is hardly felt, the native chiefs still ruling in accordance with the tribal laws, but subject to the more or less shadowy control of a European resident.

A SHAN BEAUTY

In the hot weather the Shan girls discard the bright jacket usually worn and draw up the underskirt, which is then tied tightly under the arms. The overskirt is of the brightest hue and often covered with the most elaborate embroidery. The turban is black, with many rows of bright colored silk and gold threads running through it. Young girls arrange the ends so that they hang loose at each side of the head behind the ears, which are pierced to receive ornaments, usually cylinders of gold, jade or even colored glass.

KACHIN WOMEN

Kachin women wear short skirts of strong, heavy cloth of the brightest colors. Their jackets are of velvet or cloth, ornamented with cowrie shells, silver discs, and white bone buttons. The turbans of married women are black, while the girls wear no kind of headdress. They wear a great many cane girdles, from 10 to 20 or more, between the waist and the knee. These girdles are generally black, but sometimes they are white or scarlet, embellished with the inevitable cowrie shells.

CHIN GIRLS

These girls belong to a tribe that have hardly come into contact with civilization. Unlike the Burmese, who are Buddhists, they are worshipers of nature spirits, and, although some missionaries have settled among them, but little progress has been made.

XUM

PAGODAS AT PAGAN

"Though Pagan was never a religious city in the sense in which Lhassa, governed by monks, is a religious city, it came to have a great many pagodas, thousands of them (later one ruler is said to have used 4,000 of them at one time to build fortifications); and some of the best of these, in better or worse state of preservation, are all that remain of ancient Pagan" (see page 845).

Photo by Alfred Joseph Smith

PALAUNG WOMEN OF UPPER BURMA

"The females of one branch of the Karens and Palaungs wear brass rings around their necks, arms, and legs, weighing, it is said, 50 to 60 pounds. The neck rings, as thick as the little finger, are put on the girl in infancy, four or five rings at first and others added as fast as she grows, till 18 or 20 keep the neck always stretched" (see page 852).

XUM

and fraternities from Ceylon were welcomed, given separate quarters to live in, and permitted to "write, wrangle and excommunicate each other to their heart's content." The end of the 13th century saw the fall of Pagan, and it has ever since remained a deserted city.

FLOATING DEPARTMENT STORES ON THE IRRAWADDY

At Mandalay begins a journey into the country of the hill tribes, at war with each other till within a few years. It is said that "head-hunting" has not even now entirely ceased. From Mandalay the journey up the river should, by all means, be made by cargo steamer.

Not only does the cargo boat stop at tiny villages and at many points where one sees no signs of a village, but she tows, lashed alongside, a barge nearly as large as herself. This barge and the great after-deck of the steamer form one big "department store." Space is rented to native merchants, who go back and forth each trip, supplying the native with everything he needs, from sarongs to betel.

Each merchant, in his few square feet of allotted space, arranges his wares exactly as in the little booth along the village street. Hundreds of natives swarm aboard at each stopping place, carrying baskets and bags for their purchases.

One is reminded every hour of the day from how many and diverse elements is to be welded the Burmese nation of the future. All originating from the same parent stock (except, perhaps, the Selung t .be), the various tribes have through the centuries contended for possession of lands, hunting and fishing grounds, for life of the simplest form, till their characteristics have become as distinctive as if of different races.

There prevails, too, in most of the clans a curious system of endogamy, which is or was very strictly enforced. Only the people who live in certain groups of villages, for instance, may intermarry, or in some cases only cousins are permitted. The half-grown boys are separated from the girls and are kept apart till married. The Burmese, though in the ascendant, are really one of many tribes making up the population of Burma.

THE MANY TRIBES THAT INHABIT BURMA

Here are the stocky, picturesque Shans, with their bright plaids, heavily bedecked with brass and silver buttons, bells, and other ornaments. The Kachin women wear a score or more belts of narrow hoops, stained black and falling over the hips in a manner to require frequent adjusting. They come from the Shan States to the East; are rather attractive in form and feature; eaters of lizards, of beetles, of snakes—in fact, of everything except human flesh, which is forbidden.

Here are (so-called) white Karens, heavy and stolid and very dirty, of fairer skin than the Burmese and with a more distinctly Mongolian eye. They take kindly to Christianity, whole villages at a time, as also do the Red Karens, a tribe less numerous, small and wiry, with broad reddish faces. Heavy drinkers these, somber in mien, formerly very wild and savage, they have been reduced from stealers of men to stealers of cattle.

Here are men and women of many clans or tribes, their characteristics in form, features, and dress sufficiently marked, but so varied and complex as to render classification difficult except after study and a longer acquaintance.

The females of one branch of the Karens and Palaungs wear brass rings around their necks, arms, and legs, weighing, it is said, 50 to 60 pounds. The neck rings, as thick as the little finger, are put on the girl in infancy, four or five rings at first and others added as fast as she grows, till 18 or 20 keep the neck always stretched (see page 851).

And so one journeys on and on, each day bringing new scenes, new types of people to study, and all at least 1,000 years behind the epoch in which we live. Everywhere are pagodas—great pagodas, little pagodas, all sorts and sizes of pagodas, to fit the purses of the people who sought to "gain merit" in their building.

The Burman is not provident. If he has money he spends it at once. He builds a "rest home," a pagoda, a shelter for a water-jar at the roadside for the wayfarer, and keeps the jar filled with water; always he gives to the monks,

and often when in funds his generosity takes the form of a *pwé* at full moon. For this he engages musicians, actors, and dancers, and invites everybody to come. The stage is usually covered, but the audience sits under the sky, strolls under the trees, eats, smokes, sleeps now and then for an hour, while all night long the entertainment goes on.

Beside each village is a monastery, and about the monastery are always noble trees, for Buddha commanded meditation under the trees. These monasteries are of teakwood, dark and rich in coloring, and bring out in sharp relief the yellow robes of the monks.

A SIMPLE GUILELESS PEOPLE

Here are no noble classes, no aristocracy, none very rich, none very poor.

Superstitious as are all ignorant people, believers in charms, their superstitions never take the form of cruel rites, blood offerings, etc. Their lives are frank and open, with none of the dark places so common to other Orientals.

This may not always be so literally true, as in the pictures sometimes drawn by some enthusiastic travelers, where one is shown the family eating, the sleeping rugs spread on the floor, beneath which, in all the primitive simplicity of a pastoral people, are the cattle in their stalls. This is, however, by no means untrue, taken as a general average, of this simple, happy people, where everything is open to the light of the day. They marry and divorce without constraint of any religion; their women are the freest in the world, and they are chaste and happy to a degree rarely to be found elsewhere.

The Burman minds his own affairs and meddles not at all in his neighbor's. Courteous assistance *when it is asked*, and an equally courteous and infinitely more rare non-interference under all other circumstances is the rule in Burma and the teaching of Buddha. Here is no officious advice, no managing the affairs of others. How rare! How beautiful, even if carried to the extreme of letting a man drown himself if he be so minded or die in any way he pleases.

The traveler, to acquire any wisdom in his travels, must go always with an open mind. He must not judge Buddha, Brahma, or Mohammed from the acts of their followers any more than he may judge Christ from the acts of men of Christian nations, or His teachings from the way we do not embody them in our lives. We are sure there has been revealed to us in our religion truth from behind the veil. We cannot prove it except by our faith, our belief. The Oriental is equally sure that his is the true faith, that through his prophet was revealed the divine truth.

This attitude of mind is essential to any comprehension of other peoples, of their customs, of their lives, and this is why missionaries going out with intense religious conviction (which is very necessary), surcharged with zeal *against* all other religions and even sects sometimes fail to get into really sympathetic relations with the devout of other faiths.

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IN THE STREETS OF LEH

The city of Leh is the capital of Ladakh, sometimes called Little Tibet. It lies at an elevation of over 11,000 feet above the sea, in a narrow valley, through which flow the upper waters of the River Indus. This picturesque town, surrounded by walls, is a great trading center, and to it flock merchants from other parts of Kashmir, from Lhasa, Afghanistan, and Turkestan. An active trade in furs, shawls, and wool is conducted here. It is also an important religious center for the northern Buddhists, both on account of its own lamaseries and temples and of the important lamasery of Spitok, which is not far distant, the abbot of which is a person of great religious prominence in Kashmir.

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PEASANTS OF LITTLE TIBET

Little Tibet is the most barren and inhospitable region in all Kashmir, and its unfortunate peasants wring with difficulty a living from the soil. The climate is very severe, and furs, even if only sheepskins, are a necessity. The soil is sterile, but the sides of the mountains which lie in a sheltered position are terraced with great skill and cultivated with an almost incredible industry. Up to an elevation of 13,000 feet above the sea these peasants, by careful attention, manage to cultivate the apricot, and they grow barley, buckwheat, and apples sufficient for their own use.

PEASANT LIFE IN ALBANIA

In the mountains of Albania the lot of the peasant is often squalid in the extreme. They possess no land of their own, but work that of the great Moslem land-owners on the métayer system, moving from place to place and living in miserable straw huts. The condition of the women is pitiable; they are subjected to the heaviest toil and live in complete subjection; they bring no dowry to their husbands and are purchased at a price, like cattle.

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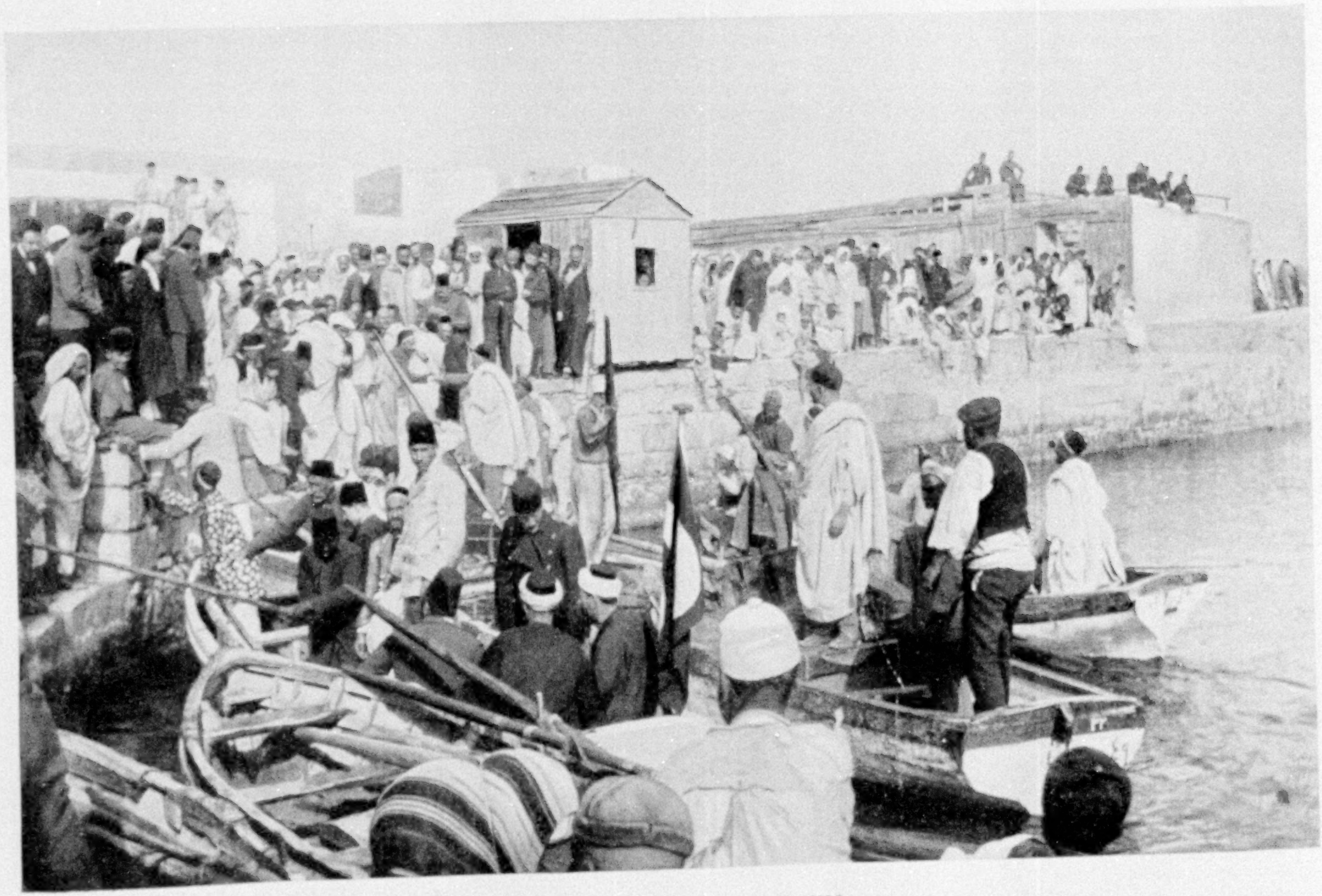

TRIPOLITAN PILGRIMS EMBARKING

One of the most picturesque sights at any North African port is the annual departure of the pilgrims for Mecca. This picture shows the embarkation of pilgrims at Benghazi, one of the ports of Tripoli. It is an animated scene; the crowd has come from all parts of the country. There are nomads from the desert, negroes from the oases of the far Sahara, half-breeds from the ports, and stately Arabs from the coast. These pilgrim crowds, though picturesque, are a source of danger to the cities they pass through, as they often carry with them diseases of every kind. A few years ago the pilgrims introduced typhus into the port of Benghazi, and it raged with such virulence that 8,000 people died in a few weeks.

SEMEISKI WOMEN

The Semeiski are a sect of Russian nonconformists who have emigrated to Siberia and have established themselves on the eastern shores of Lake Baikal. They are a thrifty, industrious, and moral people, living in great isolation, which has tended to preserve their curious costume. They are excellent farmers and grow all the grain used in the government mines in Siberia. In each Semeiski village there is a prayer-house in which all the inhabitants say their prayers in common and where the elders read the lives of the saints and explain difficult texts of Scripture. They live without priests, but once every three years they assemble at Yaroslav, a town on the upper Volga, where one of their priests resides, to receive the sacraments. During the interval baptisms and marriages are performed by the local elders.

SEVILLE CIGARETTE-MAKERS AT WORK

In Southern Spain man is too dignified to work, so when anything has to be done it falls to the lot of his women folk. Not even will he supply his own luxuries; so his cigarettes have to be made for him by the gentler sex. In good truth, however, it must be admitted that Spain has no monopoly of this system; our own factories are filled with women.

A MADAGASCAN QUEEN AND HER COURT

Before the annexation of Madagascar by the French, the island contained a large number of kings and queens, tributary to the sovereign at Antananarivo. This photograph was taken when Queen Binao, the ruler of the country around Norri Bé, in the northwest of the island, made her submission to General Gallieni, representing the French government.

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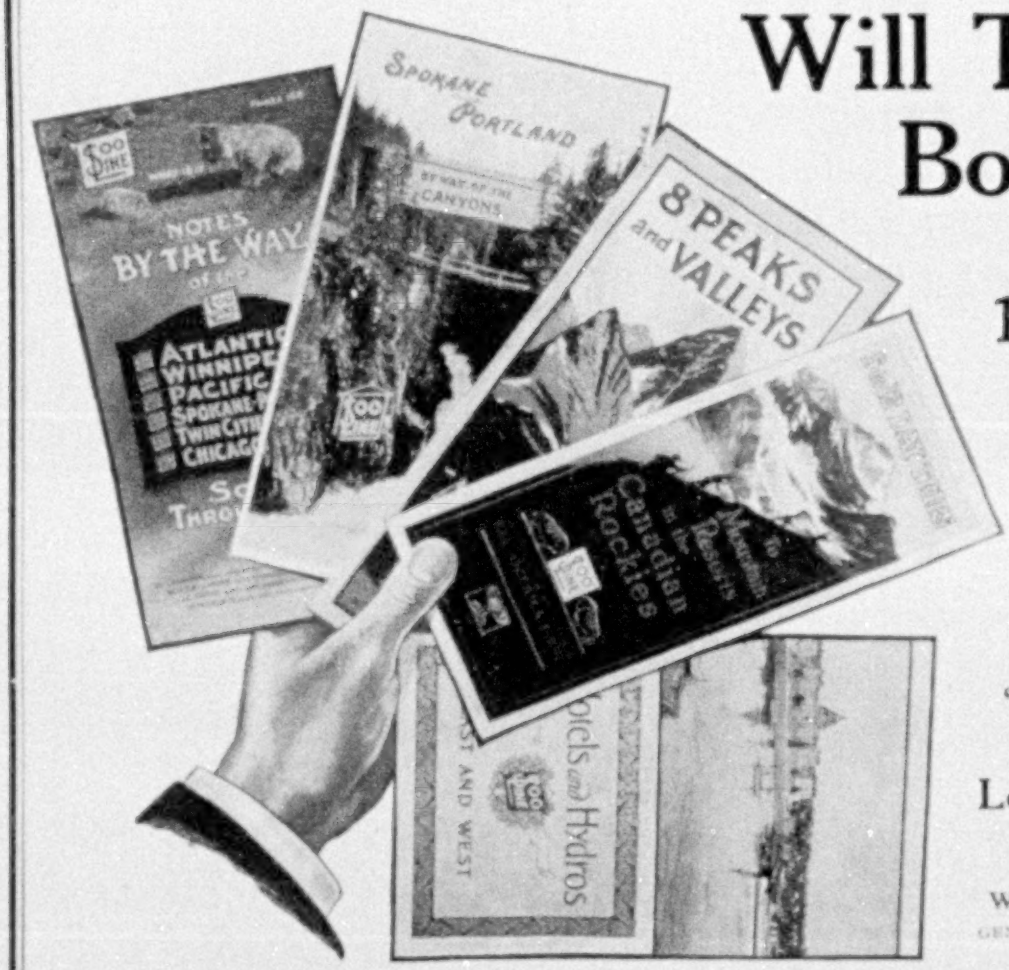

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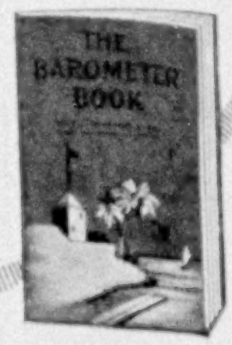

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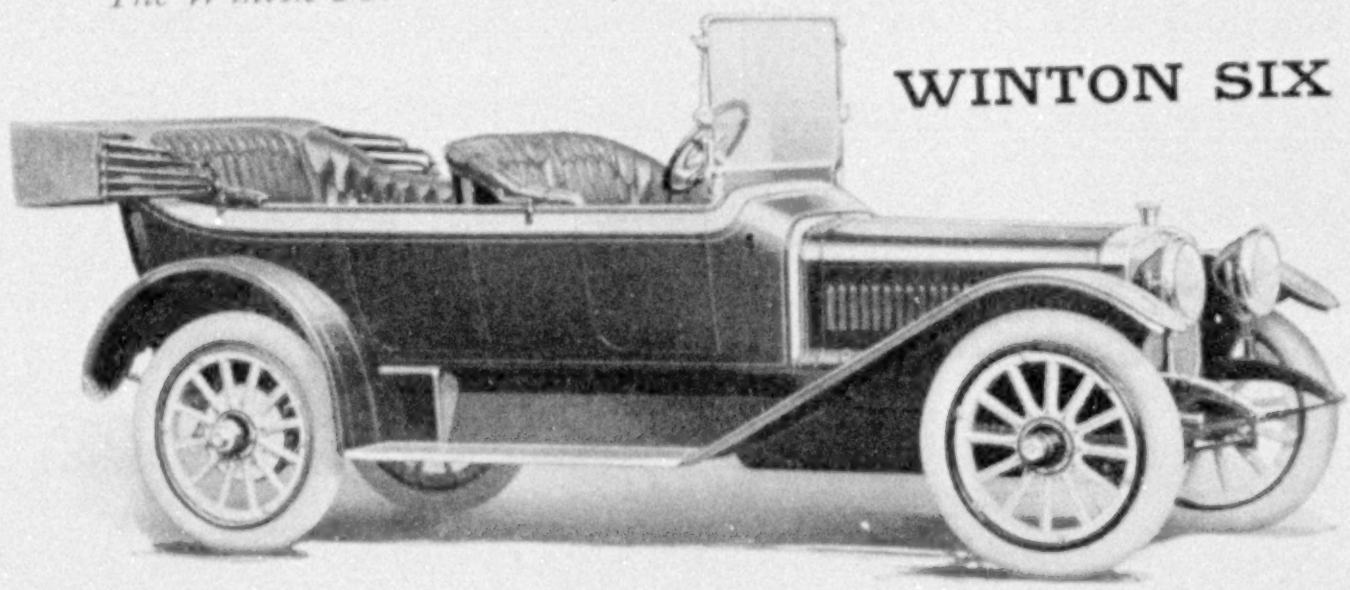

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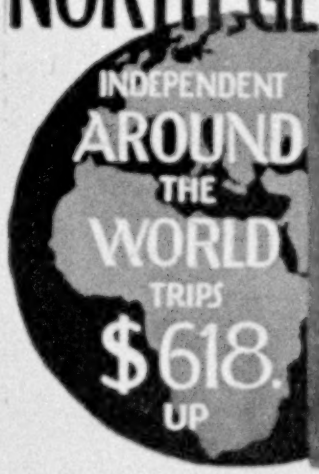

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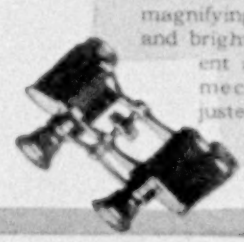

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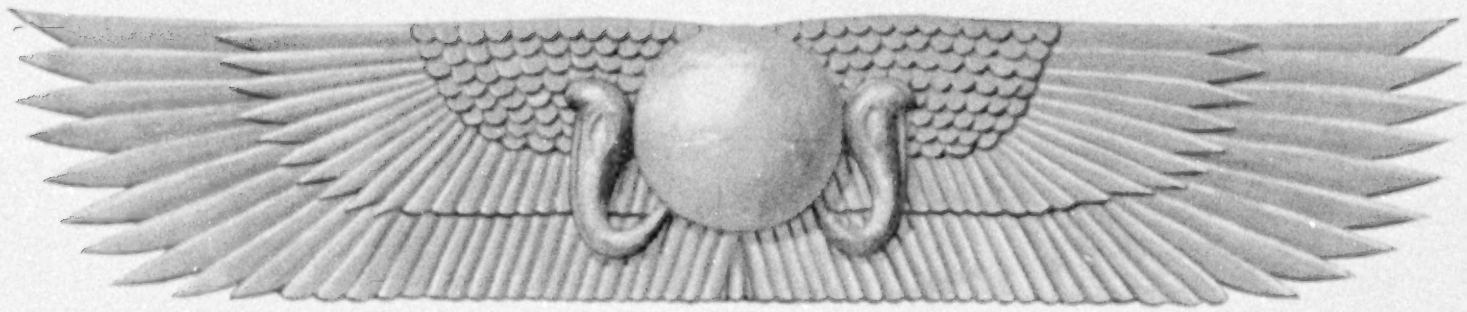

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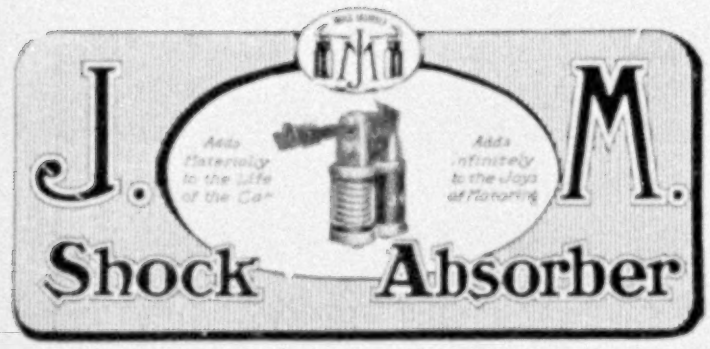

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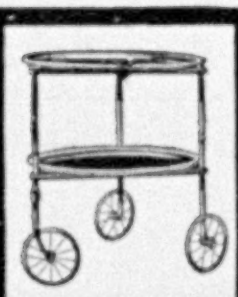

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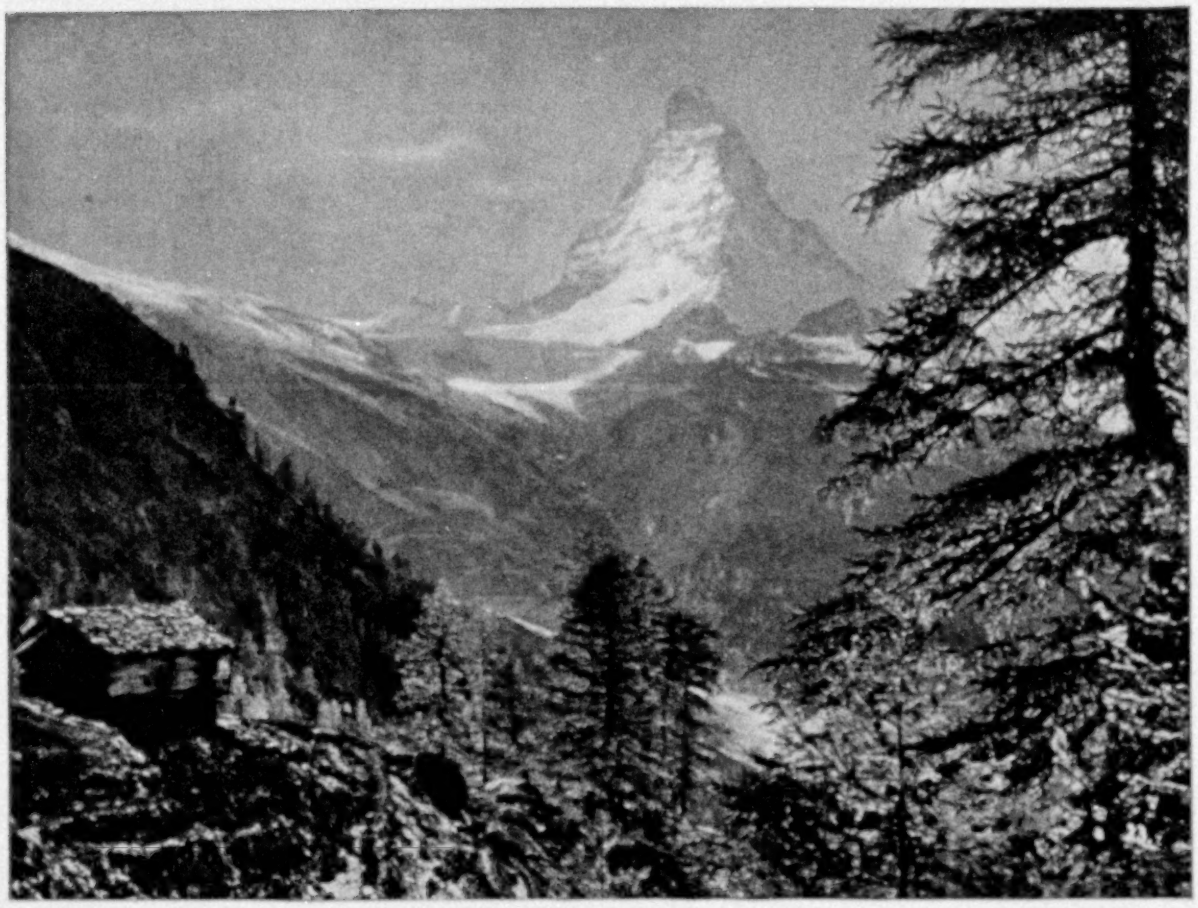

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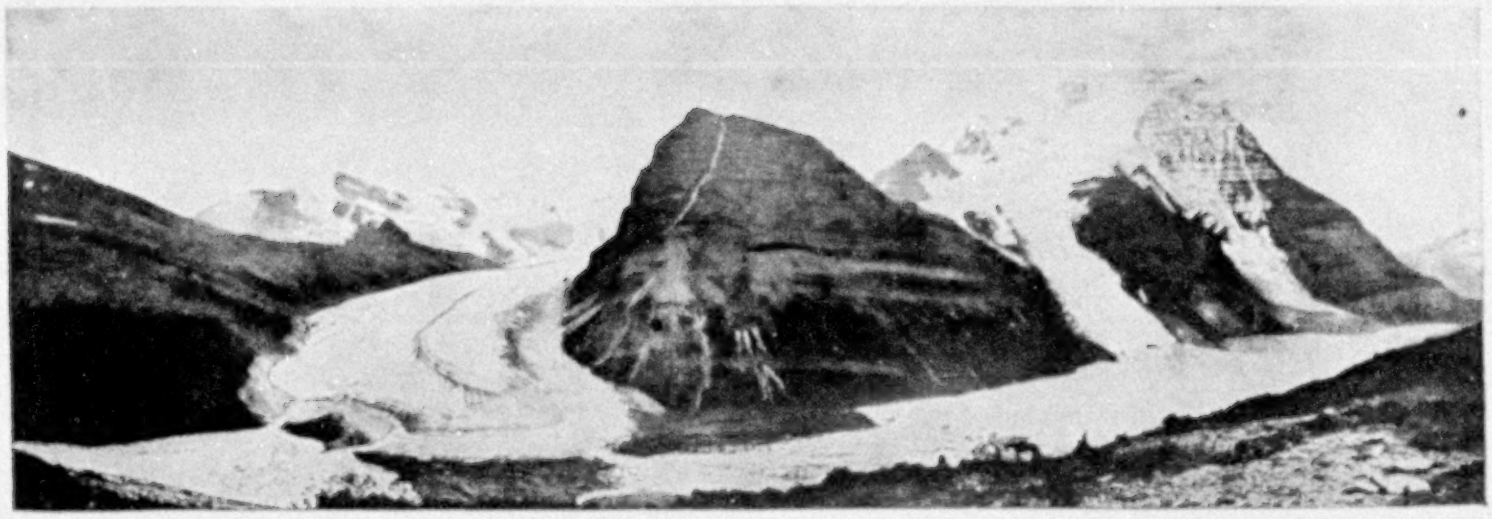

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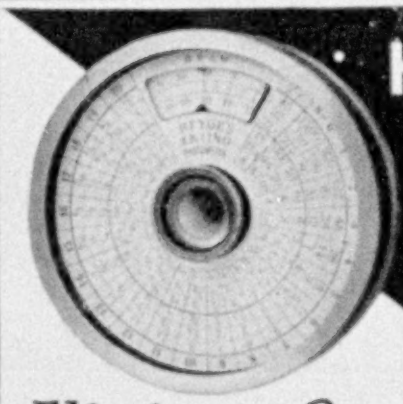

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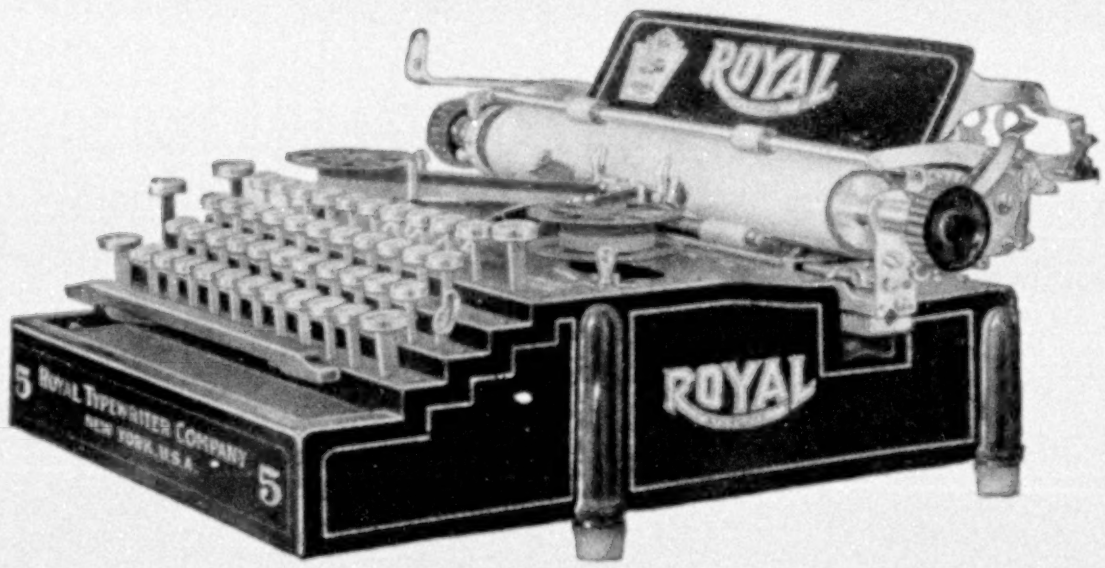

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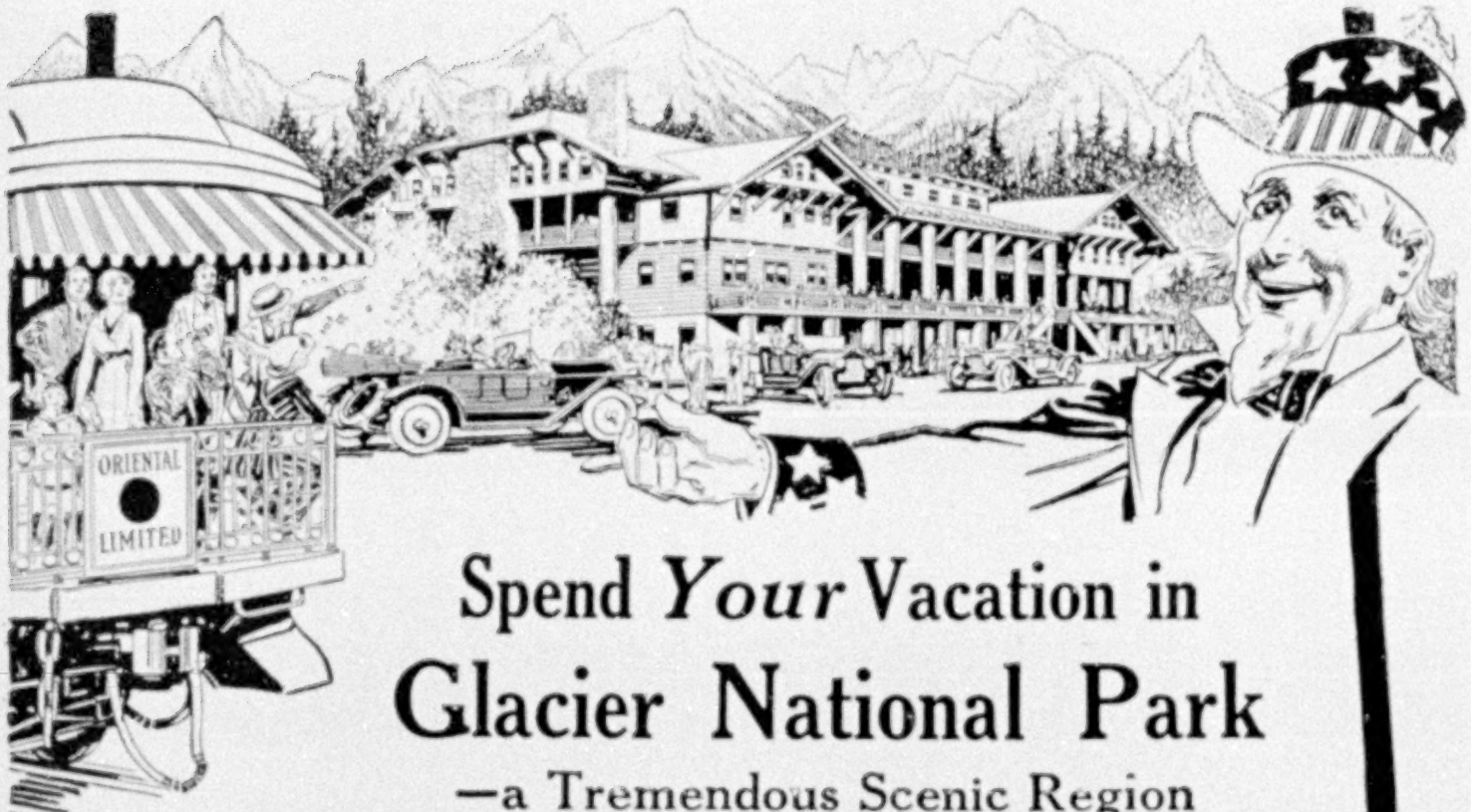

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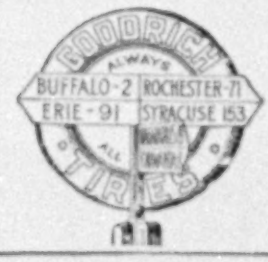

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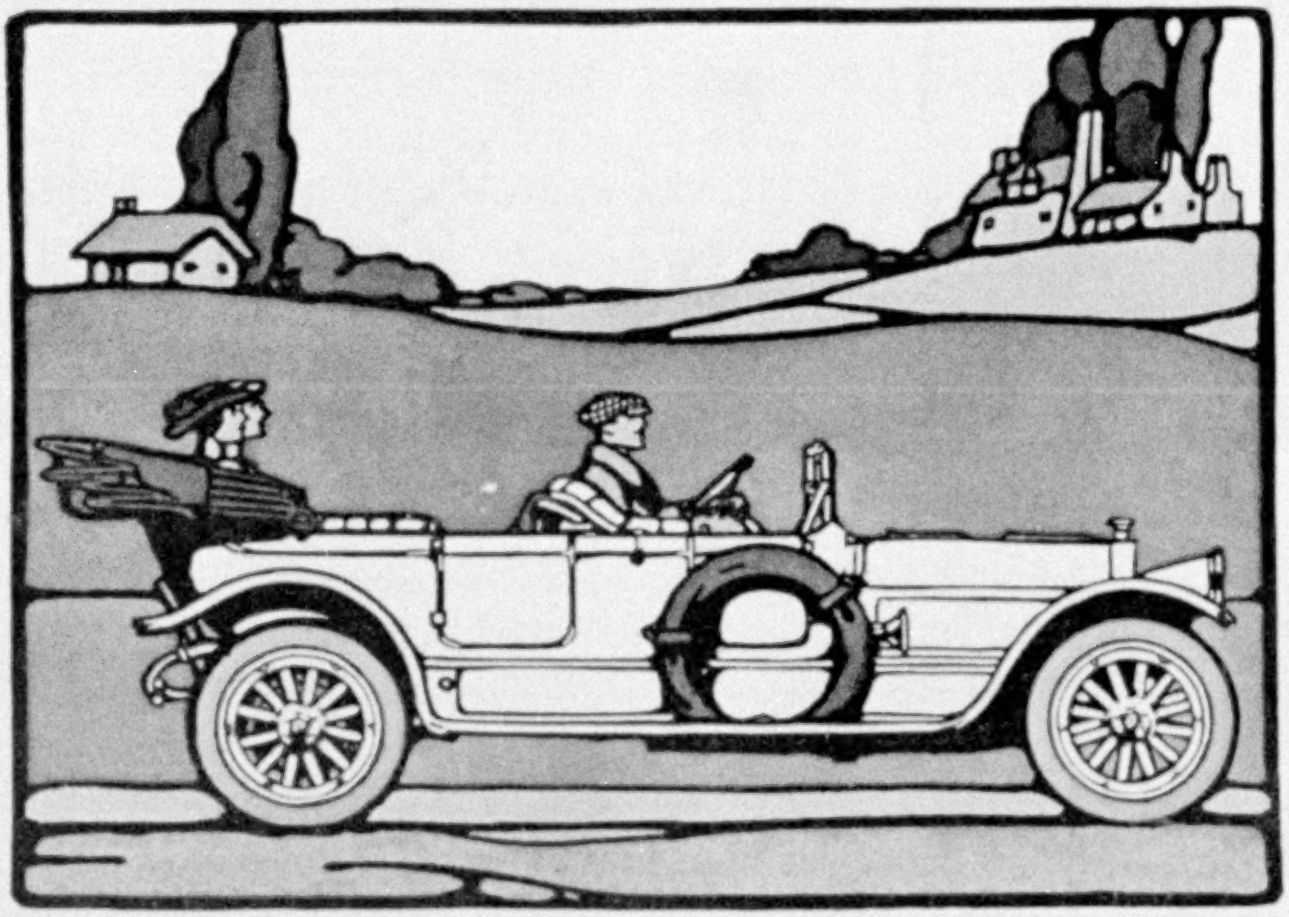

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